

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES	
2. AMENDMENT/MODIFICATION NO.		3. EFFECTIVE DATE		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO. (If applicable)	
6. ISSUED BY		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(X)		9A. AMENDMENT OF SOLICITATION NO.	
						9B. DATED (SEE ITEM 11)	
						10A. MODIFICATION OF CONTRACT/ORDER NO.	
						10B. DATED (SEE ITEM 11)	
CODE		FACILITY CODE					

**11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

☐
The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers
☐
is extended,
☐
is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing items 8 and 15, and returning \_\_\_\_\_ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

**13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS.  
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

**E. IMPORTANT:** Contractor ☐ is not, ☐ is required to sign this document and return \_\_\_\_\_ copy to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		(Signature of Contracting Officer)	

Item 14. Continued.

### **CHANGES TO BIDDING SCHEDULE**

1. Replace the Bidding Schedule, with the accompanying new Bidding Schedule bearing the notation "ACCOMPANYING AMENDMENT NO. 0001 TO SOLICITATION NO. DACA63-01-R-0016."

### **CHANGES TO THE BIDDING REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT**

2. Replacement Sections - Replace the following section with the accompanying new section of the same number and title, bearing the notation "Revised by Amendment 0001:"

SECTION 00150 EVALUATION FACTORS FOR AWARD

### **CHANGES TO THE SPECIFICATIONS**

3. Delete Sections.- Delete the following sections:

SECTION 06200 FINISH CARPENTRY  
SECTION 07110 BITUMINOUS DAMPPROOFING  
SECTION 07132 BITUMINOUS WATERPROOFING

4. Replacement Sections - Replace the following sections with the accompanying new sections of the same number and title, bearing the notation "ACCOMPANYING AMENDMENT NO. 0001 TO SOLICITATION NO. DACA63-01-R-0016:"

SECTION 04200 MASONRY  
SECTION 05500 MISCELLANEOUS METAL  
SECTION 06100 ROUGH CARPENTRY  
SECTION 07416 STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM  
SECTION 07720 ROOF VENTILATORS, GRAVITY-TYPE  
SECTION 07900 JOINT SEALING  
SECTION 08110 STEEL DOORS AND FRAMES  
SECTION 08120 ALUMINUM DOORS AND FRAMES  
SECTION 08210 WOOD DOORS  
SECTION 08330 OVERHEAD ROLLING DOORS  
SECTION 08510 STEEL WINDOWS  
SECTION 08520 ALUMINUM AND ENVIRONMENTAL CONTROL ALUMINUM WINDOWS  
SECTION 08700 BUILDERS' HARDWARE  
SECTION 08810 GLASS AND GLAZING  
SECTION 09310 CERAMIC TILE  
SECTION 09510 ACOUSTICAL CEILINGS  
SECTION 09650 RESILIENT FLOORING  
SECTION 09680 CARPET  
SECTION 09900 PAINTING, GENERAL  
SECTION 09915 COLOR SCHEDULE  
SECTION 10100 VISUAL COMMUNICATIONS SPECIALTIES  
SECTION 10101 MISCELLANEOUS ITEMS  
SECTION 10442 INTERIOR SIGNAGE  
SECTION 10650 OPERABLE PARTITIONS  
SECTION 10800 TOILET ACCESSORIES  
SECTION 12600 THEATER CHAIRS  
SECTION 13120 STANDARD METAL BUILDING SYSTEMS

## CHANGES TO THE DRAWINGS

5. New Drawings.- The new drawing listed below which accompanies this amendment, bearing the notation "AM #0001" shall be added to and become a part of the contract documents:

c725.cal Seq 127 C725 ROAD PROFILE - HOT LOAD BYPASS ROAD (BID OPTION #2)  
h01.cal Seq 186 h01 STORMWATER CONTROL PLAN 1  
h02.cal Seq 187 h02 STORMWATER CONTROL PLAN 2  
h03.cal Seq 188 h03 STORMWATER CONTROL PLAN 3  
h04.cal Seq 189 h04 STORMWATER CONTROL PLAN 4  
h05.cal Seq 190 h05 STORMWATER CONTROL PLAN 5  
h06.cal Seq 191 h06 STORMWATER CONTROL PLAN 6  
h07.cal Seq 192 h07 STORMWATER CONTROL PLAN 7  
h08.cal Seq 193 h08 STORMWATER CONTROL PLAN 8  
h09.cal Seq 194 h09 STORMWATER CONTROL PLAN 9  
h10.cal Seq 195 h10 STORMWATER CONTROL PLAN 10  
h11.cal Seq 196 h11 STORMWATER CONTROL PLAN 11  
h12.cal Seq 197 h12 STORMWATER CONTROL PLAN 12  
h13.cal Seq 198 h13 STORMWATER CONTROL PLAN 13  
h14.cal Seq 199 h14 STORMWATER CONTROL PLAN 14  
h15.cal Seq 200 h15 STORMWATER CONTROL PLAN 15  
h16.cal Seq 201 h16 STORMWATER CONTROL PLAN 16  
h17.cal Seq 202 h17 STORMWATER CONTROL PLAN 17  
h18.cal Seq 203 h18 STORMWATER CONTROL PLAN 18  
h19.cal Seq 204 H19 STORMWATER CONTROL PLAN 19  
h20.cal Seq 205 h20 STORMWATER CONTROL PLAN 20  
h21.cal Seq 206 h21 STORMWATER CONTROL PLAN 21  
h22.cal Seq 207 h22 STORMWATER CONTROL PLAN 22  
h23.cal Seq 208 h23 EROSION AND SEDIMENT CONTROL DETAILS  
h24.cal Seq 209 h24 DOSING WET WELL DETAILS  
h24A.cal Seq 209A h24a SEPTIC SYSTEM DETAILS

6. Replacement Drawings.- Replace the drawings listed below with the attached new drawings of the same number, bearing the notation "AM #0001":

gi1.cal Seq GI1 GI1 INDEX SHEET VOL 1  
c105.cal Seq 8 C105 DEMOLITION PLAN 5  
C200A.cal Seq 9 C200A OVERALL PLAN w/ KEY MAP  
C203.cal Seq 13 C203 LAYOUT PLAN 3  
C204.cal Seq 14 C204 LAYOUT PLAN 4  
C205.cal Seq 15 C205 LAYOUT PLAN 5  
C206.cal Seq 16 C206 LAYOUT PLAN 6  
C208.cal Seq 18 C208 LAYOUT PLAN 8  
C209.cal Seq 19 C209 LAYOUT PLAN 9  
C210.cal Seq 20 C210 LAYOUT PLAN 10  
C211.cal Seq 21 C211 LAYOUT PLAN 11  
C212.cal Seq 22 C212 LAYOUT PLAN 12  
C214.cal Seq 24 C214 LAYOUT PLAN 14  
C215.cal Seq 25 C215 LAYOUT PLAN 15  
C215A.cal Seq 26 C215A LAYOUT PLAN 15A - ENGINE MAINTENANCE FACILITY  
C216.cal Seq 27 C216 LAYOUT PLAN 16  
C217.cal Seq 28 C217 LAYOUT PLAN 17  
C217A.cal Seq 29 C217A LAYOUT PLAN 17A - RAIL OPERATIONS CENTER  
C218.cal Seq 30 C218 LAYOUT PLAN 18  
C219.cal Seq 31 C219 LAYOUT PLAN 19  
C220.cal Seq 32 C220 LAYOUT PLAN 20

C221.cal Seq 33 C221 LAYOUT PLAN 20  
 C222.cal Seq 34 C222 LAYOUT PLAN 22  
 c315A.cal Seq 54 C315A GRADING PLAN 15A - ENGINE MAINTENANCE FACILITY  
 c317A.cal Seq 57 C317A GRADING PLAN 17A - RAIL OPERATIONS CENTER  
 c322.cal Seq 62 C322 GRADING PLAN 22  
 c708.cal Seq 110 C708 TRACK PROFILES - TRACK H2, TRACK I2  
 c709.cal Seq 111 C709 TRACK PROFILES - TRACK I1  
 c725.cal Seq 127 C725 ROAD PROFILE - HOT LOAD BYPASS ROAD (BID OPTION #2)  
 c801.cal Seq 130 C801 TYPICAL PAVING SECTIONS 2  
 c802.cal Seq 131 C802 TYPICAL ROAD SECTIONS FOR MAIN ACCESS ROAD  
 c816.cal Seq 145 C816 GRADE CROSSING DETAILS  
 a106.cal Seq 215 A1.06 BUILDING SECTIONS  
 a107.cal Seq 216 A1.07 WALL SECTIONS  
 i101.cal Seq 226 I1.01 FURNITURE FLOOR PLAN  
 i103.cal Seq 228 I1.03 ROOM FINISH SCHEDULE  
 a212.cal Seq 242 A2.12 MISCELLANEOUS DETAILS  
 i202.cal Seq 246 I2.02 ROOM FINISH SCHEDULE  
 a302.cal Seq 250 A3.02 INTERIOR ELEVATIONS  
 i301.cal Seq 260 I3.01 FINISHES AND FLOOR PLAN  
 eu16.cal Seq 335 EU16 ELECTRICAL SITE PLAN 1  
 eu17.cal Seq 336 EU17 ELECTRICAL SITE PLAN 2  
 eu18.cal Seq 337 EU18 ELECTRICAL SITE PLAN 3  
 eu19.cal Seq 338 EU19 ELECTRICAL SITE PLAN 4  
 eu20.cal Seq 339 EU20 ELECTRICAL SITE PLAN 5  
 eu22.cal Seq 341 EU22 ELECTRICAL SITE PLAN 7  
 eu23.cal Seq 342 EU23 ELECTRICAL SITE PLAN 8  
 eu25.cal Seq 344 EU25 ELECTRICAL SITE PLAN 10  
 eu26.cal Seq 345 EU26 ELECTRICAL SITE PLAN 11  
 eu27.cal Seq 346 EU27 NOTE SHEET FOR ELECTRICAL SITE PLANS 11 & 12  
 eu28.cal Seq 347 EU28 ELECTRICAL SITE PLAN 12  
 eu29.cal Seq 348 EU29 ELECTRICAL SITE PLAN 13  
 eu30.cal Seq 349 EU30 ELECTRICAL SITE PLAN 14  
 eu31.cal Seq 350 EU31 ELECTRICAL SITE PLAN 15  
 eu32.cal Seq 351 EU32 ELECTRICAL SITE PLAN 16  
 eu33.cal Seq 352 EU33 ELECTRICAL SITE PLAN 17  
 eu34.cal Seq 353 EU34 ELECTRICAL SITE PLAN 18  
 eu35.cal Seq 354 EU35 ELECTRICAL SITE PLAN 19  
 eu36.cal Seq 355 EU36 ELECTRICAL SITE PLAN 20  
 eu37.cal Seq 356 EU37 ELECTRICAL SITE PLAN 21  
 eu40.cal Seq 359 EU40 RAILROAD SIGNAL PLAN 1  
 eu41.cal Seq 360 EU41 RAILROAD SIGNAL PLAN 2  
 eu42.cal Seq 361 EU42 RAILROAD SIGNAL PLAN 3  
 eu62.cal Seq 381 EU62 EXTERIOR CIRCUIT AND CONDUIT SCHEDULE, SHEET 6  
 eu82.cal Seq 401 EU82 EXTERIOR ELECTRICAL DETAILS, SHEET 3  
 eu84.cal Seq 403 EU84 EXTERIOR ELECTRICAL DETAILS, SHEET 5  
 e01.cal Seq 410 E0.1 Electrical Legends & Lighting Fixture Schedule  
 e12.cal Seq 414 E1.2 Administration Bldg. Interior Power Plan  
 e22.cal Seq 419 E2.2 Engine Repair Bldg. Interior Power Plan  
 e24.cal Seq 421 E2.4 Engine Repair Bldg. Panel Schedules & Riser Diagram  
 e31.cal Seq 423 E3.1 Latrine & Scale Shack Lighting, Comm., & Power Plan

END OF AMENDMENT

RAIL DEPLOYMENT COMPLEX (Title)  
FORT BLISS, TEXAS (Location)

Solicitation No.DACA63-01-R-0016

**BIDDING SCHEDULE**  
 (To be attached to SF 1442)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Rail Deployment Complex buildings; complete including all utilities to the 1524 mm line of the building, and exclusive of separately listed items.	Job	Sum	***	\$_____
0002	All Exterior Work outside the buildings' 1524mm (5-Ft) line (Including all utilities, earthwork, curb and gutter, demolition) and all other work not listed separately	Job	Sum	***	\$_____
<b><u>(am#1) 0003</u></b>	<b><u>305mm</u></b> Concrete Pavement (Excluding Subbase and Subgrade)	4468	M3	\$_____	\$_____
0004	215mm Concrete Pavement (Excluding Subbase and Subgrade)	5357	M3	\$_____	\$_____
0005	290mm Concrete Pavement (Excluding Subbase and Subgrade)	2692	M3	\$_____	\$_____
<b><u>(am#1) 0006</u></b>	90mm High Stability HMSC (Excluding all Base and Subgrade)	<b><u>11078</u></b>	MT	\$_____	\$_____

**(am#1) 0007 Deleted Item**

0008	Final Record Drawings	Job	Sum	**	\$107,250
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[\*\*NOTE: Bid Item 0008 was arrived at by multiplying the number of drawings by \$250]

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				TOTAL	\$_____
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OPTION NO. 1: All work required by the plans and specifications for the construction of the Interchange Yard. Including work required for Tracks I1, I2, and I3, the modifications to the adjacent existing railroad track, storm drainage, and electrical work.

0009	Interchange Yard complete	Job	Sum	***	\$_____
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OPTION NO. 2: All work required by the plans and specifications for the construction of the Hot Load Bypass Road.

0010	90mm High Stability HMSC (Excluding all Base and Subgrade)	905	MT	\$_____	\$_____
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0011	All other work not listed separately.	Job	Sum	***	\$_____
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OPTION NO. 3: All work required by the plans and specifications for the construction of the concrete pavement at the Hot Load Container Loading Apron along Track H2.

0012	290mm Concrete Pavement (Excluding Subbase and Subgrade)	2559	M3	\$_____	\$_____
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				TOTAL (BASE BID + OPTIONS NO. 1, 2, AND 3	\$_____
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### BIDDING SCHEDULE (cont)

#### NOTES:

#### 1. ARITHMETIC DISCREPANCIES (EFARS 14.407-2)

(a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the bidding schedule as submitted by bidders:

- (1) Obviously misplaced decimal points will be corrected;
- (2) In case of discrepancy between unit price and extended price, the unit price will govern;
- (3) Apparent errors in extension of unit prices will be corrected; and
- (4) Apparent errors in addition of lump-sum and extended prices will be corrected.

(b) For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends his bid to be evaluated on the basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

(c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

2. If a modification to a bid based on unit prices is submitted, which provides for a lump sum adjustment to the total estimated cost, the application of the lump sum adjustment to each unit price in the bid schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the bid schedule.

3. Bidders must bid on all items.

## BIDDING SCHEDULE (cont)

NOTES: (cont)

### 4. EXERCISE OF OPTIONS (SWDR 715-1-1 (16 January 1996))

The Government reserves the right to exercise the option(s) by written notice to the Contractor either singularly or in any combination for up to 90 calendar days after award of the Base Bid without an increase in the Offeror's Bid Price. Completion of added items shall continue at the same schedule as the Base Bid unless otherwise noted in Section 01000 CONSTRUCTION SCHEDULE, paragraph 1 entitled SCHEDULE.

### 5. ABBREVIATIONS

For the purpose of this solicitation, the units of measure are represented as follows:

- a. EA (each)
- b. GAL (gallons)
- c. CF (cubic feet)
- d. SF (square feet)
- e. LS (lump sum)
- f. MM (millimeters)
- g. LM (length in linear meters)
- h. M3 (cubic meters)
- i. MT (metric ton)

END OF BIDDING SCHEDULE

## **SECTION 00150 EVALUATION FACTORS FOR AWARD**

**1.0 BASIS FOR AWARD.** The Government intends to award one (1) contract, based upon initial offers received, without discussion of such offers. Each offer should contain the offeror's best terms. The Government will evaluate price, past performance, Small Disadvantaged Utilization Plans and Subcontracting Plans. When combined, all non-cost/price factors are approximately equal to cost or price. The Government reserves the right to conduct discussions if later it is determined by the Contracting Officer to be necessary. The right is reserved to accept other than the lowest offer and to reject any or all offers. As proposals become more equivalent, cost consideration becomes more significant and may become the determining factor for award. Any award price must be determined to be fair and reasonable.

### **2.0 PRICE/COST PROPOSAL (Weighted 75% of Non-Cost Factors)**

2.1 A price analysis will be completed of the offeror's **price/cost** proposal **as submitted on the bidding schedule** to determine price reasonableness. If adequate competition is not obtained, a detailed cost analysis will be used to evaluate for cost realism (allowability, allocability, and reasonableness).

### **3.0 PAST PERFORMANCE**

3.1 For the purpose of evaluating the Past Performance Survey information submitted hereunder:

3.1.1 Past Performance Survey data will be evaluated and scored, as it relates to the probability of the offeror successfully accomplishing the proposed effort.

3.1.2 The Government will use the Past Performance Survey data provided by the offeror (as specified in Section 00120) and data obtained from other sources in addition to these Surveys to perform this assessment.

### **4.0 SMALL DISADVANTAGED BUSINESS UTILIZATION PLANS (Weighted 25% of Non-Cost Factors)**

4.1 Small Disadvantaged Business (SDB) Utilization Plans Applies to all offerors

NOTE: Each SDB includes Small Businesses (SB), Small Disadvantaged Businesses (SDB), Woman-Owned Small Businesses (WOSB), HUB Zone Businesses (HUBZone), Veteran-Owned Small Businesses (VOSB), and Historically Black Colleges & Universities/Minority Institutions (where applicable)

4.2 SDB Utilization Plans will be evaluated based on the following:

- The extent to which SDB concerns are specifically identified.
- The extent of commitment to use SDB concerns.
- The complexity and variety of the work SDB concerns are to perform

- Show the extent of participation of SDB concerns in terms of the value of the total acquisition.

## **5.0 SUBCONTRACTING PLANS (Evaluated Separately)**

- 5.1 Subcontracting Plans will be evaluated in accordance with Appendix CC of the Army Federal Acquisition Regulation Supplement.

**6.0 EVALUATION OF OPTIONS (JUL 1990)(FAR 52.217-5)** Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

**(End of Section 00150)**

SECTION 04200

MASONRY  
07/92  
AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI SP-66 (1994) ACI Detailing Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 82	(1997a) Steel Wire, Plain, for Concrete Reinforcement
ASTM A 153/A 153M	(1998) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 615/A 615M	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 55	(1997a) Concrete Brick
ASTM C 62	(1997a) Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 67	(1998a) Sampling and Testing Brick and Structural Clay Tile
ASTM C 90	(1998) Loadbearing Concrete Masonry Units
ASTM C 91	(1998) Masonry Cement
ASTM C 129	(1997) Nonloadbearing Concrete Masonry Units
ASTM C 140	(1998b) Sampling and Testing Concrete Masonry Units
ASTM C 216	(1998) Facing Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 270	(1997a) Mortar for Unit Masonry
ASTM C 476	(1998) Grout for Masonry
ASTM C 494	(1998) Chemical Admixtures for Concrete
ASTM C 578	(1995) Rigid, Cellular Polystyrene Thermal Insulation

ASTM C 641	(1982; R 1991) Staining Materials in Lightweight Concrete Aggregates
ASTM C 652	(1997) Hollow Brick (Hollow Masonry Units Made From Clay or Shale)
ASTM C 780	(1996) Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
ASTM C 1019	(1989a; R 1998) Sampling and Testing Grout
ASTM C 1072	(1998) Measurement of Masonry Flexural Bond Strength
ASTM C 1289	(1998) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM D 2000	(1998c) Rubber Products in Automotive Applications
ASTM D 2240	(1997e1) Rubber Property - Durometer Hardness
ASTM D 2287	(1996) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
ASTM E 119	(1998) Fire Tests of Building Construction and Materials
ASTM E 447	(1992b) Compressive Strength of Masonry Prisms

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

### SD-02 Shop Drawings

#### Masonry Work; G

Drawings including plans, elevations, and details of wall reinforcement; details of reinforcing bars at corners and wall intersections; offsets; tops, bottoms, and ends of walls; control and expansion joints; and wall openings. Bar splice locations shall be shown. Drawings shall be provided showing the location and layout of glass block units. If the Contractor opts to furnish inch-pound CMU products, drawings showing elevation of walls exposed to view and indicating the location of all cut CMU products shall be submitted for approval. Bent bars shall be identified on a bending diagram and shall be referenced and located on the drawings. Wall dimensions, bar clearances, and wall openings greater than one masonry unit in area shall be shown. No approval will be given to the shop drawings until the Contractor certifies that all openings, including those for mechanical and electrical service, are shown. If, during

construction, additional masonry openings are required, the approved shop drawings shall be resubmitted with the additional openings shown along with the proposed changes. Location of these additional openings shall be clearly highlighted. The minimum scale for wall elevations shall be 1 to 50. Reinforcement bending details shall conform to the requirements of ACI SP-66.

#### SD-03 Product Data

Clay or Shale Brick; G

Glass Block Units and Accessories; G  
Insulation; G

Manufacturer's descriptive data.

Cold Weather Installation;

Cold weather construction procedures.

Concrete Masonry Unit (CMU); G  
Precast Concrete Items; G

#### SD-04 Samples

Concrete Masonry Units (CMU); G

Glass Block Units and Accessories; G  
Clay or Shale Brick; G

Color samples of three stretcher units and one unit for each type of special shape. Units shall show the full range of color and texture.

Anchors, Ties, and Bar Positioners; G

Two of each type used.

Expansion-Joint Materials; G

One piece of each type used.

Joint Reinforcement; G

One piece of each type used, including corner and wall intersection pieces, showing at least two cross wires.

Insulation; G

One piece of board type insulation, not less than 400 mm by 600 mm in size, containing the label indicating the rated permeance and R-values.

Portable Panel; G

One panel of clay or shale brick, 600 mm by 600 mm, containing approximately 24 brick facings to establish range of color and texture.

#### SD-06 Test Reports

Efflorescence Test; G  
Field Testing of Mortar; G  
Field Testing of Grout; G  
Prism tests; G  
Masonry Cement; G  
Fire-rated CMU; G

Test reports from an approved independent laboratory. Test reports on a previously tested material shall be certified as the same as that proposed for use in this project.

#### SD-07 Certificates

Clay or Shale Brick;  
Concrete Masonry Units (CMU)  
  
Control Joint Keys;  
Anchors, Ties, and Bar Positioners;  
Expansion-Joint Materials;  
Joint Reinforcement;  
Reinforcing Steel Bars and Rods;  
Masonry Cement;  
Mortar Coloring;  
Insulation;  
Precast Concrete Items;  
Mortar Admixtures;  
Grout Admixtures;  
Glass Block Units and Accessories;

Certificates of compliance stating that the materials meet the specified requirements.

Insulation;

Certificate attesting that the polyurethane or polyisocyanurate insulation furnished for the project contains recovered material, and showing an estimated percent of such recovered material.

### 1.3 SAMPLE MASONRY PANELS

After material samples are approved and prior to starting masonry work, sample masonry panels shall be constructed for each type and color of masonry required. At least 48 hours prior to constructing the sample panel or panels, the Contractor shall submit written notification to the Contracting Officer's Representative. Sample panels shall not be built in, or as part of the structure, but shall be located where directed.

#### 1.3.1 Configuration

Panels shall be L-shaped or otherwise configured to represent all of the wall elements. Panels shall be of the size necessary to demonstrate the acceptable level of workmanship for each type of masonry represented on the project. The minimum size of a straight panel or a leg of an L-shaped panel shall be 2.5 m by AM 1 1.8 m.

#### 1.3.2 Composition

Panels shall show full color range, texture, and bond pattern of the

masonry work. The Contractor's method for mortar joint tooling; grouting of reinforced vertical cores, collar joints, bond beams, and lintels; positioning, securing, and lapping of reinforcing steel; positioning and lapping of joint reinforcement (including prefabricated corners); and cleaning of masonry work shall be demonstrated during the construction of the panels. Installation or application procedures for anchors, wall ties, glass block units, CMU control joints, brick expansion joints, insulation, flashing, brick soldier, row lock courses and weep holes shall be shown in the sample panels. The panels shall contain a masonry bonded corner that includes a bond beam corner. Panels shall show parging and installation of electrical boxes and conduit. Panels that represent reinforced masonry shall contain a 600 mm by 600 mm opening placed at least 600 mm above the panel base and 600 mm away from all free edges, corners, and control joints. Required reinforcing shall be provided around this opening as well as at wall corners and control joints.

### 1.3.3 Construction Method

Where anchored veneer walls are required, the Contractor shall demonstrate and receive approval for the method of construction; i.e., either bring up the two wythes together or separately, with the insulation and appropriate ties placed within the specified tolerances across the cavity. Temporary provisions shall be demonstrated to preclude mortar or grout droppings in the cavity and to provide a clear open air space of the dimensions shown on the drawings. Where masonry is to be grouted, the Contractor shall demonstrate and receive approval on the method that will be used to bring up the masonry wythes; support the reinforcing bars; and grout cells, bond beams, lintels, and collar joints using the requirements specified herein. If sealer is specified to be applied to the masonry units, sealer shall be applied to the sample panels. Panels shall be built on a properly designed concrete foundation.

### 1.3.4 Usage

The completed panels shall be used as the standard of workmanship for the type of masonry represented. Masonry work shall not commence until the sample panel for that type of masonry construction has been completed and approved. Panels shall be protected from the weather and construction operations until the masonry work has been completed and approved. After completion of the work, the sample panels, including all foundation concrete, shall become the property of the Contractor and shall be removed from the construction site.

## 1.4 DELIVERY, HANDLING, AND STORAGE

Materials shall be delivered, handled, stored, and protected to avoid chipping, breakage, and contact with soil or contaminating material.

### 1.4.1 Masonry Units

Concrete masonry units shall be covered or protected from inclement weather and shall conform to the moisture content as specified in ASTM C 90 when delivered to the jobsite. In addition, glass block units AM 1 shall be stored with their finished sides covered. Prefabricated lintels shall be marked on top sides to show either the lintel schedule number or the number and size of top and bottom bars.

### 1.4.2 Reinforcement, Anchors, and Ties

Steel reinforcing bars, coated anchors, ties, and joint reinforcement shall be stored above the ground. Steel reinforcing bars and uncoated ties shall be free of loose mill scale and rust.

### 1.4.3 Cementitious Materials, Sand and Aggregates

Cementitious and other packaged materials shall be delivered in unopened containers, plainly marked and labeled with manufacturers' names and brands. Cementitious material shall be stored in dry, weathertight enclosures or be completely covered. Cement shall be handled in a manner that will prevent the inclusion of foreign materials and damage by water or dampness. Sand and aggregates shall be stored in a manner to prevent contamination or segregation.

## PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS

The source of materials which will affect the appearance of the finished work shall not be changed after the work has started except with Contracting Officer's approval. The Contractor has the option to use either hard metric or substitute inch-pound (soft-metric) CMU products. If the Contractor decides to substitute inch-pound CMU products, the following additional requirements shall be met:

- a. The metric dimensions indicated on the drawings shall not be altered to accommodate inch-pound CMU products either horizontally or vertically. The 100 mm building module shall be maintained, except for the CMU products themselves.
- b. Mortar joint widths shall be maintained as specified.
- c. Rebars shall not be cut, bent or eliminated to fit into the inch-pound CMU products module.
- d. Brick and inch-pound CMU products shall not be reduced in size by more than one-third (1/3) in height and one-half (1/2) in length. Cut CMU products shall not be located at ends of walls, corners, and other openings.
- e. Cut, exposed brick and CMU products shall be held to a minimum and located where they would have the least impact on the architectural aesthetic goals of the facility.
- f. Other building components, built into the CMU products, such as window frames, door frames, louvers, grilles, fire dampers, etc., that are required to be metric, shall remain metric.
- g. Additional metric guidance shall conform to Section 01415 METRIC MEASUREMENTS.

### 2.2 CLAY OR SHALE BRICK

Color range and texture of clay or shale brick shall be as indicated and shall conform to the approved sample. Grade SW shall be used for brick in contact with earth or grade and for all exterior work. Grade SW or MW shall be used in other brickwork. Brick shall be tested for efflorescence. Clay or shale brick units shall be delivered factory-blended to provide a uniform appearance and color range in the completed wall.

#### 2.2.1 Solid Clay or Shale Brick

Solid clay or shale brick shall conform to ASTM C 216, Type FBS. Brick size shall be modular and the nominal size of the brick used shall be 58 mm thick, 93 mm wide, and 193 mm long. Minimum compressive strength of the brick shall be 15.1 MPa

### 2.2.2 Hollow Clay or Shale Brick

Hollow clay or shale brick shall conform to ASTM C 652, Type HBS. Brick size shall be modular and the nominal size of the brick used shall be 58 mm (2 1/4 inches) thick, 93 mm (3 5/8 inches) wide, and 93 mm (7 5/8 inches) long. Where vertical reinforcement is shown in hollow brick, the minimum cell dimension shall be 64 mm (2-1/2 inches) and the units shall be designed to provide precise vertical alignment of the cells. Minimum compressive strength of the brick shall be 15.1 MPa (2163 psi).

### 2.3 CONCRETE MASONRY UNITS (CMU)

Hollow and solid concrete masonry units shall conform to ASTM C 90, Type I. Cement shall have a low alkali content and be of one brand.

#### 2.3.1 Aggregates

Lightweight aggregates and blends of lightweight and heavier aggregates in proportions used in producing the units, shall comply with the following requirements when tested for stain-producing iron compounds in accordance with ASTM C 641: by visual classification method, the iron stain deposited on the filter paper shall not exceed the "light stain" classification.

#### 2.3.2 Kinds and Shapes

Units shall be modular in size and shall include closer, jamb, header, lintel, and bond beam units and special shapes and sizes to complete the work as indicated. In exposed interior masonry surfaces, units having a bullnose shall be used for vertical external corners except at door, window, and louver jambs. Radius of the bullnose shall be 25 mm (1 inch). Units used in exposed masonry surfaces in any one building shall have a uniform fine to medium texture and a uniform color.

##### 2.3.2.1 Architectural Units

Units shall have patterned face shell. Face shell pattern shall be split faced. Units shall be integrally colored during manufacture. Color shall be AM 1 in accordance with SECTION 09915, Color Schedule, this specification. Patterned face shell shall be properly aligned in the completed wall.

#### 2.3.3 Fire-Rated CMU

Concrete masonry units used in fire-rated construction shown on the drawings shall be of minimum equivalent thickness for the fire rating indicated and the corresponding type of aggregates indicated in TABLE I. Units containing more than one of the aggregates listed in TABLE I will be rated on the aggregate requiring the greater minimum equivalent thickness to produce the required fire rating.

TABLE I

#### FIRE-RATED CONCRETE MASONRY UNITS

See note (a) below

Aggregate Type	Minimum equivalent thickness in mm (inches) for fire rating of:		
	4 hours	3 hours	2 hours
Pumice	120 (4.7)	100 (4.0)	75 (3.0)

TABLE I

## FIRE-RATED CONCRETE MASONRY UNITS

	See note (a) below		
Expanded slag	130 (5.0)	110 (4.2)	85 (3.3)
Expanded clay, shale, or slate	145 (5.7)	120 (4.8)	95 (3.7)
Limestone, scoria, cinders or unexpanded slag	150 (5.9)	130 (5.0)	100 (4.0)
Calcareous gravel	160 (6.2)	135 (5.3)	105 (4.2)
Siliceous gravel	170 (6.7)	145 (5.7)	115 (4.5)

(a) Minimum equivalent thickness shall equal net volume as determined in conformance with ASTM C 140 divided by the product of the actual length and height of the face shell of the unit in millimeters. Where walls are to receive plaster or be faced with brick, or otherwise form an assembly; the thickness of plaster or brick or other material in the assembly will be included in determining the equivalent thickness.

## 2.4 GLASS BLOCK UNITS AND ACCESSORIES

Glass block units shall be size, type, pattern, and style specified. Units shall be made of clear colorless glass. Pattern shall be clear with 75 percent light transmission allowance. Ventilators and accessories shall be the products manufactured by or as recommended by the glass block manufacturer.

## 2.4.1 Exterior Glass Block Units

Units shall be wave pattern, with LX fibrous glass insert frosted or sandblasted texture, and shall be 200 mm (7-3/4 inches) by 200 mm (7-3/4 inches) by 100 mm (3-7/8 inches).

## 2.4.2 [Enter Appropriate Subpart Title Here]

## 2.4.3 Horizontal Joint Reinforcement

Joint reinforcement shall be factory fabricated from steel wire, and shall conform to ASTM A 82. Wire shall be zinc coated after fabrication by the hot-dip process conforming to ASTM A 153/A 153M, Class B-2. Reinforcement shall consist of two or more parallel longitudinal wires not lighter than 9 gauge weld connected with cross wires not lighter than 14 gauge at not greater than 200 mm (8 inches) on center. At least one longitudinal wire for each face of glass block shall be provided. Out-to-out dimension of the longitudinal wires shall be 40 mm (1-1/2 inches) less than the actual width of the block. Joint reinforcement in flat sections not less than 2.40 m (8 feet) long shall be provided, except that corner reinforcements and other special shapes may be shorter.

## 2.4.4 Strip Anchor

Perforated steel strip shall be not less than 20 gauge, minimum of 45 mm (1-3/4 inches) wide by 600 mm long and galvanized after fabrication.

## 2.4.5 Wire-Type Anchor

Steel wire shall be not less than 9 gauge of approved design suitable for

use with the panel stiffener provided and galvanized after fabrication.

#### 2.4.6 Expansion Strip

Dense fibrous glass batt or material shall be as recommended by the glass block manufacturer.

#### 2.4.7 Packing (Backer Rods)

Polyethylene foam, neoprene, or filler shall be as recommended by the sealant manufacturer.

### 2.5 PRECAST CONCRETE ITEMS

Trim, lintels, copings, splashblocks and door sills shall be factory-made units from a plant regularly engaged in producing precast concrete units. Unless otherwise indicated, concrete shall be 28 MPa (4000 psi) minimum conforming to Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE using 13 mm (1/2 inch) to No. 4 nominal-size coarse aggregate, and minimum reinforcement shall be the reinforcement required for handling of the units. Clearance of 20 mm shall be maintained between reinforcement and faces of units. Unless precast-concrete items have been subjected during manufacture to saturated-steam pressure of at least 827 kPa (120 psi) for at least 5 hours, the items, after casting, shall be either damp-cured for 24 hours or steam-cured and shall then be aged under cover for 28 days or longer. Cast-concrete members weighing over 35 kg shall have built-in loops of galvanized wire or other approved provisions for lifting and anchoring. Units shall have beds and joints at right angles to the face, with sharp true arises and shall be cast with drip grooves on the underside where units overhang walls. Exposed-to-view surfaces shall be free of surface voids, spalls, cracks, and chipped or broken edges. Precast units exposed-to-view shall be of uniform appearance and color. Unless otherwise specified, units shall have a smooth dense finish. Prior to use, each item shall be wetted and inspected for crazing. Items showing evidence of dusting, spalling, crazing, or having surfaces treated with a protective coating will be rejected.

#### 2.5.1 Lintels

Precast lintels, unless otherwise shown, shall be of a thickness equal to the wall and reinforced with two No. 4 bars for the full length. Top of lintels shall be labeled "TOP" or otherwise identified and each lintel shall be clearly marked to show location in the structure.

#### 2.5.2 Sills and Copings

Sills and copings shall be cast with washes. Sills for windows having mullions shall be cast in sections with head joints at mullions and a 6 mm (1/4 inch) allowance for mortar joints. The ends of sills, except a 20 mm (3/4 inch) wide margin at exposed surfaces, shall be roughened for bond. Treads of door sills shall have rounded nosings.

#### 2.5.3 Splash Blocks

Splash blocks shall be as detailed. Reinforcement shall be the manufacturer's standard.

### 2.6 MORTAR

Mortar shall be Type S in accordance with the proportion specification of ASTM C 270 except Type S cement-lime mortar proportions shall be 1 part cement, 1/2 part lime and 4-1/2 parts aggregate; AM 1 when masonry cement ASTM C 91 is used the maximum air content shall be limited to 12

percent and performance equal to cement-lime mortar shall be verified. Verification of masonry cement performance shall be based on ASTM C 780 and ASTM C 1072. Pointing mortar in showers and kitchens shall contain ammonium stearate, or aluminum tri-stearate, or calcium stearate in an amount equal to 3 percent by weight of cement used. Cement shall have a low alkali content and be of one brand. Aggregates shall be from one source.

#### 2.6.1 Mortar Admixtures

In cold weather, a non-chloride based accelerating admixture may be used subject to approval. Accelerating admixture shall be non-corrosive, shall contain less than 0.2 percent chlorides, and shall conform to ASTM C 494, Type C.

AM 1

#### 2.7 GROUT

Grout shall conform to ASTM C 476. Cement used in grout shall have a low alkali content. Grout slump shall be between 200 and 250 mm. Grout shall be used subject to the limitations of Table III. Proportions shall not be changed and materials with different physical or chemical characteristics shall not be used in grout for the work unless additional evidence is furnished that the grout meets the specified requirements.

#### 2.7.1 Grout Admixtures

In cold weather, a non-chloride based accelerating admixture may be used subject to approval. Accelerating admixture shall be non-corrosive, shall contain less than 0.2 percent chlorides, and shall conform to ASTM C 494, Type C.

#### 2.7.2 Grout Barriers

Grout barriers for vertical cores shall consist of fine mesh wire, fiberglass, or expanded metal.

#### 2.8 ANCHORS, TIES, AND BAR POSITIONERS

Anchors and ties shall be fabricated without drips or crimps and shall be zinc-coated in accordance with ASTM A 153/A 153M, Class B-2. Steel wire used for anchors and ties shall be fabricated from steel wire conforming to ASTM A 82. Anchors and ties shall be sized to provide a minimum of 16 mm mortar cover from either face.

#### 2.8.1 Wire Mesh Ties

Wire mesh for tying 100 mm (4 inch) thick concrete masonry unit partitions to other intersecting masonry partitions shall be 13 mm (1/2 inch) mesh of minimum 16 gauge steel wire. Minimum lengths shall be not less than 300 mm.

#### 2.8.2 Wall Ties

Wall ties shall be rectangular-shaped or Z-shaped fabricated of 5 mm (3/16 inch) diameter zinc-coated steel wire. Rectangular wall ties shall be no less than 100 mm (4 inches) wide. Wall ties may also be of a continuous type conforming to paragraph JOINT REINFORCEMENT. Adjustable type wall ties, if approved for use, shall consist of two essentially U-shaped elements fabricated of 5 mm (3/16 inch) diameter zinc-coated steel wire. Adjustable ties shall be of the double pintle to eye type and shall allow a maximum of 13 mm (1/2 inch) eccentricity between each element of the tie. Play between pintle and eye opening shall be not more than 2 mm (1/16 inch).

The pintle and eye elements shall be formed so that both can be in the

same plane.

### 2.8.3 Dovetail Anchors

Dovetail anchors shall be of the flexible wire type, 5 mm (3/16 inch) diameter zinc-coated steel wire, triangular shaped, and attached to a 12 gauge or heavier steel dovetail section. These anchors shall be used for anchorage of veneer wythes or composite-wall facings extending over the face of concrete columns, beams, or walls. Cells within vertical planes of these anchors shall be filled solid with grout for full height of walls or partitions, or solid units may be used. Dovetail slots are specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE.

### 2.8.4 Adjustable Anchors

Adjustable anchors shall be 5 mm (3/16 inch) diameter steel wire, triangular-shaped. Anchors attached to steel shall be 8 mm (5/16 inch) diameter steel bars placed to provide 2 mm (1/16 inch) play between flexible anchors and structural steel members. Spacers shall be welded to rods and columns. Equivalent welded-on steel anchor rods or shapes standard with the flexible-anchor manufacturer may be furnished when approved. Welds shall be cleaned and given one coat of zinc-rich touch up paint.

### 2.8.5 Bar Positioners

Bar positioners, used to prevent displacement of reinforcing bars during the course of construction, shall be factory fabricated from 9 gauge steel wire or equivalent, and coated with a hot-dip galvanized finish. Not more than one wire shall cross the cell.

## 2.9 JOINT REINFORCEMENT

Joint reinforcement shall be factory fabricated from steel wire conforming to ASTM A 82, welded construction. Tack welding will not be acceptable in reinforcement used for wall ties. Wire shall have zinc coating conforming to ASTM A 153/A 153M, Class B-2. All wires shall be a minimum of 9 gauge. Reinforcement shall be ladder type design, having one longitudinal wire in the mortar bed of each face shell for hollow units and one wire for solid units. Joint reinforcement shall be placed a minimum of 16 mm cover from either face. The distance between crosswires shall not exceed 400 mm (16 inches). Joint reinforcement for straight runs shall be furnished in flat sections not less than 3m (10 feet) long. Joint reinforcement shall be provided with factory formed corners and intersections. If approved for use, joint reinforcement may be furnished with adjustable wall tie features.

### 2.10 REINFORCING STEEL BARS AND RODS

Reinforcing steel bars and rods shall conform to ASTM A 615/A 615M, Grade 60.

### 2.11 CONTROL JOINT KEYS

Control joint keys shall be a factory fabricated solid section of natural or synthetic rubber (or combination thereof) conforming to ASTM D 2000 or polyvinyl chloride conforming to ASTM D 2287. The material shall be resistant to oils and solvents. The control joint key shall be provided with a solid shear section not less than 16 mm (5/8 inch) thick and 10 mm (3/8 inch) thick flanges, with a tolerance of plus or minus 2 mm (1/16 inch). The control joint key shall fit neatly, but without forcing, in masonry unit jamb sash grooves. The control joint key shall be flexible at a temperature of minus 34 degrees C (minus 30 degrees F) after five hours exposure, and shall have a durometer hardness of not less than 70 when

tested in accordance with ASTM D 2240.

## 2.12 EXPANSION-JOINT MATERIALS

Backer rod and sealant shall be adequate to accommodate joint compression equal to 50 percent of the width of the joint. The backer rod shall be compressible rod stock of polyethylene foam, polyurethane foam, butyl rubber foam, or other flexible, nonabsorptive material as recommended by the sealant manufacturer. Sealant shall conform to Section 07900JOINT SEALING.

## 2.13 INSULATION

### 2.13.1 Rigid Board-Type Insulation

Rigid board-type insulation shall be extruded polystyrene, polyurethane, or polyisocyanurate. Polystyrene shall conform to ASTM C 578. Polyurethane or polyisocyanurate shall conform to ASTM C 1289, Type I, Class 2, faced with aluminum foil on both sides of the foam. The insulation shall be a standard product and shall be marked with not less than the manufacturer's trademark or name, the specification number, the permeance and R-values.

#### 2.13.1.1 Insulation Thickness and Air Space

The cavity space shall allow for a maximum insulation thickness of 50 mm, and a minimum air space of 20 mm (3/4 inch).

#### 2.13.1.2 Aged R-Value

The insulation shall provide a minimum aged R-value of 2 (11) for the overall thickness. The aged R-value shall be determined at 24 degrees C (75 degrees F) in accordance with the appropriate referenced specification.

The stated R-value of the insulation shall be certified by an independent testing laboratory or certified by an independent Registered Professional Engineer if tests are conducted in the manufacturer's laboratory.

#### 2.13.1.3 Recovered Material

Insulation shall contain the highest practicable percentage of recovered material derived from solid waste (but material reused in the manufacturing process cannot be counted toward the percentage of recovered material). Where two materials have the same price and performance, the one containing the higher recovered material content shall be provided. The polyurethane or polyisocyanurate foam shall have a minimum recovered material content of 9 percent by weight of the core material.

### 2.13.2 Insulation Adhesive

Insulation adhesive shall be specifically prepared to adhere the insulation to the masonry and, where applicable, to the thru-wall flashing. The adhesive shall not deleteriously affect the insulation, and shall have a record of satisfactory and proven performance for the conditions under which to be used.

## 2.14 FLASHING

Flashing shall be as specified in Section 07600 SHEET METALWORK, GENERAL.

## 2.15 WEEP HOLE VENTILATORS

Weephole ventilators shall be prefabricated aluminum grill type vents designed to prevent insect entry with maximum air entry. Ventilators shall be sized to match modular construction with a standard 10 mm (3/8 inch

mortar joint.

## PART 3 EXECUTION

### 3.1 ENVIRONMENTAL REQUIREMENTS

#### 3.1.1 Hot Weather Installation

The following precautions shall be taken if masonry is erected when the ambient air temperature is more than 37 degrees C in the shade and the relative humidity is less than 50 percent. All masonry materials shall be shaded from direct sunlight; mortar beds shall be spread no more than 1.2 m ahead of masonry; masonry units shall be set within one minute of spreading mortar; and after erection, masonry shall be protected from direct exposure to wind and sun for 48 hours.

#### 3.1.2 Cold Weather Installation

Before erecting masonry when ambient temperature or mean daily air temperature falls below 4 degrees C, a written statement of proposed cold weather construction procedures shall be submitted for approval. The following precautions shall be taken during all cold weather erection.

##### 3.1.2.1 Preparation

Ice or snow formed on the masonry bed shall be thawed by the application of heat. Heat shall be applied carefully until the top surface of the masonry is dry to the touch. Sections of masonry deemed frozen and damaged shall be removed before continuing construction of those sections.

- a. Air Temperature 4 to 0 degrees C. Sand or mixing water shall be heated to produce mortar temperatures between 4 degrees C and 49 degrees C.
- b. Air Temperature 0 to minus 4 degrees C. Sand and mixing water shall be heated to produce mortar temperatures between 4 degrees C and 49 degrees C. Temperature of mortar on boards shall be maintained above freezing.
- c. Air Temperature minus 4 to minus 7 degrees C. Sand and mixing water shall be heated to provide mortar temperatures between 4 degrees C and 49 degrees C. Temperature of mortar on boards shall be maintained above freezing. Sources of heat shall be used on both sides of walls under construction. Windbreaks shall be employed when wind is in excess of 24 km/hour.
- d. Air Temperature minus 7 degrees C and below. Sand and mixing water shall be heated to provide mortar temperatures between 4 degrees C and 49 degrees C. Enclosure and auxiliary heat shall be provided to maintain air temperature above 0 degrees C. Temperature of units when laid shall not be less than minus 7 degrees C.

##### 3.1.2.2 Completed Masonry and Masonry Not Being Worked On

- a. Mean daily air temperature 4 degrees C to 0 degrees C. Masonry shall be protected from rain or snow for 24 hours by covering with weather-resistive membrane.
- b. Mean daily air temperature 0 degrees C to minus 4 degrees C. Masonry shall be completely covered with weather-resistant membrane for 24 hours.

- c. Mean Daily Air Temperature minus 4 degrees C to minus 7 degrees C. Masonry shall be completely covered with insulating blankets or equally protected for 24 hours.
- d. Mean Daily Temperature minus 7 degrees C and Below. Masonry temperature shall be maintained above 0 degrees C for 24 hours by enclosure and supplementary heat, by electric heating blankets, infrared heat lamps, or other approved methods.

### 3.1.2.3 Glass Block Requirements

Glass block shall not be laid when the air temperature is below 4 degrees C on a falling thermometer, or when it appears probable that temperatures below 4 degrees C will be encountered before the mortar has set, unless adequate means are provided for protecting the work from freezing. Protection shall consist of heating and maintaining the temperature of the glass block and mortar materials at not less than 4 degrees C and not more than 71 degrees C. After erection, an air temperature above 4 degrees C on both sides of the glass block shall be maintained for not less than 72 hours. Work will not be permitted with or on frozen materials. Glass block work may be started at 1 degree C on a rising thermometer.

## 3.2 LAYING MASONRY UNITS

Masonry units shall be laid in AM 1 running bond pattern. Facing courses shall be level with back-up courses, unless the use of adjustable ties has been approved in which case the tolerances shall be plus or minus 13 mm. Each unit shall be adjusted to its final position while mortar is still soft and plastic. Units that have been disturbed after the mortar has stiffened shall be removed, cleaned, and relaid with fresh mortar. Air spaces, cavities, chases, expansion joints, and spaces to be grouted shall be kept free from mortar and other debris. Units used in exposed masonry surfaces shall be selected from those having the least amount of chipped edges or other imperfections detracting from the appearance of the finished work. Vertical joints shall be kept plumb. Units being laid and surfaces to receive units shall be free of water film and frost. Solid units shall be laid in a nonfurrowed full bed of mortar. Mortar for veneer wythes shall be beveled and sloped toward the center of the wythe from the cavity side. Units shall be shoved into place so that the vertical joints are tight. Vertical joints of brick and the vertical face shells of concrete masonry units, except where indicated at control, expansion, and isolation joints, shall be completely filled with mortar. Mortar will be permitted to protrude up to 13 mm into the space or cells to be grouted. Means shall be provided to prevent mortar from dropping into the space below. In double wythe construction, the inner wythe may be brought up not more than 400 mm ahead of the outer wythe. Collar joints shall be filled with mortar or grout during the laying of the facing wythe, and filling shall not lag the laying of the facing wythe by more than 200 mm.

### 3.2.1 Surface Preparation

Surfaces upon which masonry is placed shall be cleaned of laitance, dust, dirt, oil, organic matter, or other foreign materials and shall be slightly roughened to provide a surface texture with a depth of at least 3 mm. Sandblasting shall be used, if necessary, to remove laitance from pores and to expose the aggregate.

### 3.2.2 Forms and Shores

Forms and shores shall be sufficiently rigid to prevent deflections which may result in cracking or other damage to supported masonry and sufficiently tight to prevent leakage of mortar and grout. Supporting forms and shores shall not be removed in less than 10 days.

### 3.2.3 Concrete Masonry Units

Units in piers, pilasters, columns, starting courses on footings, solid foundation walls, lintels, and beams, and where cells are to be filled with grout shall be full bedded in mortar under both face shells and webs. Other units shall be full bedded under both face shells. Head joints shall be filled solidly with mortar for a distance in from the face of the unit not less than the thickness of the face shell. Foundation walls below grade shall be grouted solid. Jamb units shall be of the shapes and sizes to conform with wall units. Solid units may be incorporated in the masonry work where necessary to fill out at corners, gable slopes, and elsewhere as approved. Double walls shall be stiffened at wall-mounted plumbing fixtures by use of strap anchors, two above each fixture and two below each fixture, located to avoid pipe runs, and extending from center to center of the double wall. Walls and partitions shall be adequately reinforced for support of wall-hung plumbing fixtures when chair carriers are not specified.

### 3.2.4 Clay or Shale Brick Units

Brick facing shall be laid with the better face exposed. Brick shall be laid in running bond with each course bonded at corners, unless otherwise indicated. Molded brick shall be laid with the frog side down. Brick that is cored, recessed, or has other deformations may be used in sills, treads, soldier courses, except where deformations will be exposed to view.

#### 3.2.4.1 Wetting of Units

Wetting of clay, shale brick, or hollow brick units having an initial rate of absorption of more than 0.155 gm per minute per square cm (1 gm per minute per square inch) of bed surface shall be in conformance with ASTM C 67. The method of wetting shall ensure that each unit is nearly saturated but surface dry when laid.

#### 3.2.4.2 Solid Units

Bed, head, and collar joints shall be completely filled with mortar.

#### 3.2.4.3 Hollow Units

Hollow units shall be laid as specified for concrete masonry units.

### 3.2.5 Tolerances

Masonry shall be laid plumb, true to line, with courses level. Bond pattern shall be kept plumb throughout. Corners shall be square unless noted otherwise. AM 1 Masonry shall be laid within the following tolerances (plus or minus unless otherwise noted):

TABLE II

#### TOLERANCES

Variation from the plumb in the lines  
and surfaces of columns, walls and arises

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In adjacent masonry units	3 mm
In 3 m	6 mm
In 6 m	10 mm
In 12 m or more	13 mm

## TOLERANCES

Variations from the plumb for external corners,  
expansion joints, and other conspicuous lines

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In 6 m	6 mm
In 12 m or more	13 mm

Variations from the level for exposed lintels,  
sills, parapets, horizontal grooves, and other  
conspicuous lines

---

In 6 m	6 mm
In 12 m or more	13 mm

Variation from level for bed joints and top  
surfaces of bearing walls

---

In 3 m	6 mm
In 12 m or more	13 mm

Variations from horizontal lines

---

In 3 m	6 mm
In 6 m	10 mm
In 12 m or more	13 mm

Variations in cross sectional dimensions of  
columns and in thickness of walls

---

Minus	6 mm
Plus	13 mm

## 3.2.6 Cutting and Fitting

Full units of the proper size shall be used wherever possible, in lieu of cut units. Cutting and fitting, including that required to accommodate the work of others, shall be done by masonry mechanics using power masonry saws. Concrete masonry units may be wet or dry cut. Wet cut units, before being placed in the work, shall be dried to the same surface-dry appearance as uncut units being laid in the wall. Cut edges shall be clean, true and sharp. Openings in the masonry shall be made carefully so that wall plates, cover plates or escutcheons required by the installation will completely conceal the openings and will have bottoms parallel with the masonry bed joints. Reinforced masonry lintels shall be provided above openings over 300 mm wide for pipes, ducts, cable trays, and other wall penetrations, unless steel sleeves are used.

## 3.2.7 Jointing

Joints shall be tooled when the mortar is thumbprint hard. Horizontal joints shall be tooled last. Joints shall be brushed to remove all loose and excess mortar. Mortar joints shall be finished as follows:

## 3.2.7.1 Flush Joints

Joints in concealed masonry surfaces and joints at electrical outlet boxes in wet areas shall be flush cut. Flush cut joints shall be made by cutting

off the mortar flush with the face of the wall. Joints in unparged masonry walls below grade shall be pointed tight. Flush joints for architectural units, such as fluted units, shall completely fill both the head and bed joints.

#### 3.2.7.2 Tooled Joints

Joints in exposed exterior masonry surfaces shall be tooled slightly concave.

Joints in exposed interior masonry surfaces shall be tooled flush. Joints shall be tooled with a jointer slightly larger than the joint width so that complete contact is made along the edges of the unit. Tooling shall be performed so that the mortar is compressed and the joint surface is sealed.

Jointer of sufficient length shall be used to obtain a straight and true mortar joint.

#### 3.2.7.3 Door and Window Frame Joints

On the exposed interior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 10 mm. On the exterior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 10 mm.

#### 3.2.8 Joint Widths

Joint widths shall be as follows:

##### 3.2.8.1 Concrete Masonry Units

Concrete masonry units shall have 10 mm (3/8 inch) joints.

#### AM 1

##### 3.2.8.2 Brick

Brick joint widths shall be the difference between the actual and nominal dimensions of the brick in either height or length. Brick expansion joint widths shall be as shown.

##### 3.2.9 Embedded Items

Spaces around built-in items shall be filled with mortar. Openings around flush-mount electrical outlet boxes in wet locations shall be pointed with mortar. Anchors, ties, wall plugs, accessories, flashing, pipe sleeves and other items required to be built-in shall be embedded as the masonry work progresses. Anchors, ties and joint reinforcement shall be fully embedded in the mortar. Cells receiving anchor bolts and cells of the first course below bearing plates shall be filled with grout.

##### 3.2.10 Unfinished Work

Unfinished work shall be stepped back for joining with new work. Toothing may be resorted to only when specifically approved. Loose mortar shall be removed and the exposed joints shall be thoroughly cleaned before laying new work.

##### 3.2.11 Masonry Wall Intersections

Each course shall be masonry bonded at corners and elsewhere as shown. Masonry walls shall be anchored or tied together at corners and intersections with bond beam reinforcement and prefabricated corner or tee pieces of joint reinforcement as shown.

##### 3.2.12 Partitions

Partitions shall be continuous from floor to underside of floor or roof deck where shown. Openings in firewalls around joists or other structural members shall be filled as indicated or approved. Where suspended ceilings on both sides of partitions are indicated, the partitions other than those shown to be continuous may be stopped approximately 100 mm (4 inches) above the ceiling level. An isolation joint shall be placed in the intersection between partitions and structural or exterior walls as shown. Interior partitions having 100 mm (4 inch) nominal thick units shall be tied to intersecting partitions of 100 mm (4 inch) units, 125 mm into partitions of 150 mm (6 inch) units, and 175 into partitions of 200 mm (8 inch) or thicker units. Cells within vertical plane of ties shall be filled solid with grout for full height of partition or solid masonry units may be used.

Interior partitions having masonry walls over 100 mm (4 inches) thick shall be tied together with joint reinforcement. Partitions containing joint reinforcement shall be provided with prefabricated pieces at corners and intersections or partitions.

### 3.3 ANCHORED VENEER CONSTRUCTION

The inner and outer wythes shall be completely separated by a continuous airspace as shown on the drawings. Both the inner and the outer wythes shall be laid up together except when adjustable joint reinforcement assemblies are approved for use. When both wythes are not brought up together, through-wall flashings shall be protected from damage until they are fully enclosed in the wall. The airspace between the wythes shall be kept clear and free of mortar droppings by temporary wood strips laid on the wall ties and carefully lifted out before placing the next row of ties.

A coarse gravel or drainage material shall be placed behind the weep holes in the cavity to a minimum depth of 100 mm of coarse aggregate or 250 mm of drainage material to keep mortar droppings from plugging the weep holes.

### 3.4 WEEP HOLES

Weep holes shall be provided not more than 600 mm on centers in mortar joints of the exterior wythe above wall flashing, over foundations, bond beams, and any other horizontal interruptions of the cavity. Weep holes shall be constructed using weep hole ventilators. Other approved methods may be used for providing weep holes. Weep holes shall be kept free of mortar and other obstructions.

### 3.5 COMPOSITE WALLS

Masonry wythes shall be tied together with joint reinforcement or with unit wall ties. Facing shall be anchored to concrete backing with wire dovetail anchors set in slots built in the face of the concrete as specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE. The facing wythe shall be anchored or tied to the backup at a maximum spacing of 400 mm (16 inches) on center vertically and 600 mm (24 inches) on center horizontally. Unit ties shall be spaced not over 600 mm (24 inches) on centers horizontally, in courses not over 400 mm (16 inches) apart vertically, staggered in alternate courses. Ties shall be laid not closer than 16 mm to either masonry face. Ties shall not extend through control joints. Collar joints between masonry facing and masonry backup shall be filled solidly with grout.

AM 1

### 3.6 GLASS BLOCK

Glass block shall be installed as recommended by the glass block manufacturer and as specified in paragraph ENVIRONMENTAL REQUIREMENTS, after coordinating the work with other trades to accommodate embedded items.

### 3.7 MORTAR

Mortar shall be mixed in a mechanically operated mortar mixer for at least 3 minutes, but not more than 5 minutes. Measurement of ingredients for mortar shall be by volume. Ingredients not in containers, such as sand, shall be accurately measured by the use of measuring boxes. Water shall be mixed with the dry ingredients in sufficient amount to provide a workable mixture which will adhere to the vertical surfaces of masonry units. Mortar that has stiffened because of loss of water through evaporation shall be retempered by adding water to restore the proper consistency and workability. Mortar that has reached its initial set or that has not been used within 2-1/2 hours after mixing shall be discarded.

### 3.8 REINFORCING STEEL

Reinforcement shall be cleaned of loose, flaky rust, scale, grease, mortar, grout, or other coating which might destroy or reduce its bond prior to placing grout. Bars with kinks or bends not shown on the drawings shall not be used. Reinforcement shall be placed prior to grouting. Unless otherwise indicated, vertical wall reinforcement shall extend to within 50 mm of tops of walls.

#### 3.8.1 Positioning Bars

Vertical bars shall be accurately placed within the cells at the positions indicated on the drawings. A minimum clearance of 13 mm shall be maintained between the bars and masonry units. Minimum clearance between parallel bars shall be one diameter of the reinforcement. Vertical reinforcing may be held in place using bar positioners located near the ends of each bar and at intermediate intervals of not more than 192 diameters of the reinforcement. Column and pilaster ties shall be wired in position around the vertical steel. Ties shall be in contact with the vertical reinforcement and shall not be placed in horizontal bed joints.

#### 3.8.2 Splices

Bars shall be lapped a minimum of 48 diameters of the reinforcement. Welded or mechanical connections shall develop at least 125 percent of the specified yield strength of the reinforcement.

### 3.9 JOINT REINFORCEMENT

Joint reinforcement shall be installed at 400 mm (16 inches) on center or as indicated. Reinforcement shall be lapped not less than 150 mm. Prefabricated sections shall be installed at corners and wall intersections. The longitudinal wires of joint reinforcement shall be placed to provide not less than 16 mm cover to either face of the unit.

### 3.10 PLACING GROUT

Cells containing reinforcing bars shall be filled with grout. Hollow masonry units in walls or partitions supporting plumbing, heating, or other mechanical fixtures, voids at door and window jambs, and other indicated spaces shall be filled solid with grout. Cells under lintel bearings on each side of openings shall be filled solid with grout for full height of openings. Walls below grade, lintels, and bond beams shall be filled solid with grout. Units other than open end units may require grouting each course to preclude voids in the units. Grout not in place within 1-1/2 hours after water is first added to the batch shall be discarded. Sufficient time shall be allowed between grout lifts to preclude displacement or cracking of face shells of masonry units. If blowouts, flowouts, misalignment, or cracking of face shells should occur during

construction, the wall shall be torn down and rebuilt.

### 3.10.1 Vertical Grout Barriers for Fully Grouted Walls

Grout barriers shall be provided not more than 10 m apart, or as required, to limit the horizontal flow of grout for each pour.

### 3.10.2 Horizontal Grout Barriers

Grout barriers shall be embedded in mortar below cells of hollow units receiving grout.

### 3.10.3 Grout Holes and Cleanouts

#### 3.10.3.1 Grout Holes

Grouting holes shall be provided in slabs, spandrel beams, and other in-place overhead construction. Holes shall be located over vertical reinforcing bars or as required to facilitate grout fill in bond beams. Additional openings spaced not more than 400 mm (16 inches) on centers shall be provided where grouting of all hollow unit masonry is indicated. Openings shall not be less than 100 mm in diameter or 75 by 100 mm in horizontal dimensions. Upon completion of grouting operations, grouting holes shall be plugged and finished to match surrounding surfaces.

#### 3.10.3.2 Cleanouts for Hollow Unit Masonry Construction

Cleanout holes shall be provided at the bottom of every pour in cores containing vertical reinforcement when the height of the grout pour exceeds 1.5 m. Where all cells are to be grouted, cleanout courses shall be constructed using bond beam units in an inverted position to permit cleaning of all cells. Cleanout holes shall be provided at a maximum spacing of 800 mm (32 inches) where all cells are to be filled with grout. A new series of cleanouts shall be established if grouting operations are stopped for more than 4 hours. Cleanouts shall not be less than 75 by 100 mm openings cut from one face shell. Manufacturer's standard cutout units may be used at the Contractor's option. Cleanout holes shall not be closed until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected. For walls which will be exposed to view, cleanout holes shall be closed in an approved manner to match surrounding masonry.

#### 3.10.3.3 Cleanouts for Solid Unit Masonry Construction

Cleanouts for construction of walls consisting of a grout filled cavity between solid masonry wythes shall be provided at the bottom of every pour by omitting every other masonry unit from one wythe. A new series of cleanouts shall be established if grouting operations are stopped for more than 4 hours. Cleanout holes shall not be plugged until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected. For walls which will be exposed to view, cleanout holes shall be closed in an approved manner to match surrounding masonry.

### 3.10.4 Grouting Equipment

#### 3.10.4.1 Grout Pumps

Pumping through aluminum tubes will not be permitted. Pumps shall be operated to produce a continuous stream of grout without air pockets, segregation, or contamination. Upon completion of each day's pumping, waste materials and debris shall be removed from the equipment, and disposed of outside the masonry.

#### 3.10.4.2 Vibrators

Internal vibrators shall maintain a speed of not less than 5,000 impulses per minute when submerged in the grout. At least one spare vibrator shall be maintained at the site at all times. Vibrators shall be applied at uniformly spaced points not further apart than the visible effectiveness of the machine. Duration of vibration shall be limited to time necessary to produce satisfactory consolidation without causing segregation.

#### 3.10.5 Grout Placement

Masonry shall be laid to the top of a pour before placing grout. Grout shall not be placed in two-wythe solid unit masonry cavity until mortar joints have set for at least 3 days during hot weather and 5 days during cold damp weather. Grout shall not be placed in hollow unit masonry until mortar joints have set for at least 24 hours. Grout shall be placed using a hand bucket, concrete hopper, or grout pump to completely fill the grout spaces without segregation of the aggregates. Vibrators shall not be inserted into lower pours that are in a semi-solidified state. The height of grout pours and type of grout used shall be limited by the dimensions of grout spaces as indicated in Table III. Low-lift grout methods may be used on pours up to and including 1.5 m in height. High-lift grout methods shall be used on pours exceeding 1.5 m in height.

##### 3.10.5.1 Low-Lift Method

Grout shall be placed at a rate that will not cause displacement of the masonry due to hydrostatic pressure of the grout. Mortar protruding more than 13 mm into the grout space shall be removed before beginning the grouting operation. Grout pours 300 mm or less in height shall be consolidated by mechanical vibration or by puddling. Grout pours over 300 mm in height shall be consolidated by mechanical vibration and reconsolidated by mechanical vibration after initial water loss and settlement has occurred. Vibrators shall not be inserted into lower pours that are in a semi-solidified state. Low-lift grout shall be used subject to the limitations of Table III.

##### 3.10.5.2 High-Lift Method

Mortar droppings shall be cleaned from the bottom of the grout space and from reinforcing steel. Mortar protruding more than 6 mm into the grout space shall be removed by dislodging the projections with a rod or stick as the work progresses. Reinforcing, bolts, and embedded connections shall be rigidly held in position before grouting is started. CMU units shall not be pre-wetted. Grout, from the mixer to the point of deposit in the grout space shall be placed as rapidly as practical by pumping and placing methods which will prevent segregation of the mix and cause a minimum of grout splatter on reinforcing and masonry surfaces not being immediately encased in the grout lift. The individual lifts of grout shall be limited to 1.2 m in height. The first lift of grout shall be placed to a uniform height within the pour section and vibrated thoroughly to fill all voids. This first vibration shall follow immediately behind the pouring of the grout using an approved mechanical vibrator. After a waiting period sufficient to permit the grout to become plastic, but before it has taken any set, the succeeding lift shall be poured and vibrated 300 to 450 mm into the preceding lift. If the placing of the succeeding lift is going to be delayed beyond the period of workability of the preceding, each lift shall be reconsolidated by reworking with a second vibrator as soon as the grout has taken its settlement shrinkage. The waiting, pouring, and reconsolidation steps shall be repeated until the top of the pour is reached. The top lift shall be reconsolidated after the required waiting period. The high-lift grouting of any section of wall between vertical grout barriers shall be completed to the top of a pour in one working day.

unless a new series of cleanout holes is established and the resulting horizontal construction joint cleaned. High-lift grout shall be used subject to the limitations in Table III.

TABLE III

## POUR HEIGHT AND TYPE OF GROUT FOR VARIOUS GROUT SPACE DIMENSIONS

Maximum Grout Pour Height (m) (4)	Grout Type	Grouting Procedure	Minimum Dimensions of the Total Clear Areas Within Grout Spaces and Cells (mm) (1,2)	
			Multiwythe Masonry (3)	Hollow-unit Masonry
0.3	Fine	Low Lift	20	40 x 50
1.5	Fine	Low Lift	50	50 x 75
2.4	Fine	High Lift	50	50 x 75
3.6	Fine	High Lift	65	65 x 75
7.3	Fine	High Lift	75	75 x 75
0.3	Coarse	Low Lift	40	40 x 75
1.5	Coarse	Low Lift	50	65 x 75
2.4	Coarse	High Lift	50	75 x 75
3.6	Coarse	High Lift	65	75 x 75
7.3	Coarse	High Lift	75	75 x 100

## Notes:

- (1) The actual grout space or cell dimension must be larger than the sum of the following items:
  - a) The required minimum dimensions of total clear areas given in the table above;
  - b) The width of any mortar projections within the space;
  - c) The horizontal projections of the diameters of the horizontal reinforcing bars within a cross section of the grout space or cell.
- (2) The minimum dimensions of the total clear areas shall be made up of one or more open areas, with at least one area being 20 mm or greater in width.
- (3) For grouting spaces between masonry wythes.
- (4) Where only cells of hollow masonry units containing reinforcement are grouted, the maximum height of the pour shall not exceed the distance between horizontal bond beams.

## 3.11 BOND BEAMS

Bond beams shall be filled with grout and reinforced as indicated on the drawings. Grout barriers shall be installed under bond beam units to retain the grout as required. Reinforcement shall be continuous, including around corners, except through control joints or expansion joints, unless otherwise indicated on the drawings. Where splices are required for continuity, reinforcement shall be lapped 48 bar diameters. A minimum clearance of 13 mm shall be maintained between reinforcement and interior faces of units.

## 3.12 CONTROL JOINTS

Control joints shall be provided as indicated and shall be constructed by using sash jamb units with control joint key in accordance with the details shown on the drawings. Sash jamb units shall have a 19 by 19 mm (3/4 by 3/4 inch) groove near the center at end of each unit. The vertical mortar

joint at control joint locations shall be continuous, including through all bond beams. This shall be accomplished by utilizing half blocks in alternating courses on each side of the joint. The control joint key shall be interrupted in courses containing continuous bond beam steel. In single wythe exterior masonry walls, the exterior control joints shall be raked to a depth of 20 mm; backer rod and sealant shall be installed in accordance with Section 07900 JOINT SEALING. Exposed interior control joints shall be raked to a depth of 6 mm. Concealed control joints shall be flush cut.

### 3.13 BRICK EXPANSION JOINTS AND CONCRETE MASONRY VENEER JOINTS

Brick expansion joints and concrete masonry veneer joints shall be provided and constructed as shown on the drawings. Joints shall be kept free of mortar and other debris.

### 3.14 SHELF ANGLES

Shelf angles shall be adjusted as required to keep the masonry level and at the proper elevation. Shelf angles shall be galvanized. Shelf angles shall be provided in sections not longer than 3 m and installed with a 6 mm gap between sections. Shelf angles shall be mitered and welded at building corners with each angle not shorter than 1.2 m, unless limited by wall configuration.

### 3.15 LINTELS

#### 3.15.1 Masonry Lintels

Masonry lintels shall be constructed with lintel units filled solid with grout in all courses and reinforced with a minimum of two No. 4 bars in the bottom course unless otherwise indicated on the drawings. Lintel reinforcement shall extend beyond each side of masonry opening 40 bar diameters or 600 mm, whichever is greater. Reinforcing bars shall be supported in place prior to grouting and shall be located 15 mm above the bottom inside surface of the lintel unit.

#### 3.15.2 Precast Concrete and Steel Lintels

Precast concrete and steel lintels shall be as shown on the drawings. Lintels shall be set in a full bed of mortar with faces plumb and true. Steel and precast lintels shall have a minimum bearing length of 200 mm (8 inches) unless otherwise indicated on the drawings.

### 3.16 SILLS AND COPINGS

Sills and copings shall be set in a full bed of mortar with faces plumb and true.

### 3.17 ANCHORAGE TO CONCRETE AND STRUCTURAL STEEL

#### 3.17.1 Anchorage to Concrete

Anchorage of masonry to the face of concrete columns, beams, or walls shall be with dovetail anchors spaced not over 400 mm (16 inches) on centers vertically and 600 mm (24 inches) on center horizontally.

#### 3.17.2 Anchorage to Structural Steel

Masonry shall be anchored to vertical structural steel framing with adjustable steel wire anchors spaced not over 400 mm (16 inches) on centers vertically, and if applicable, not over 600 mm (24 inches) on centers horizontally.

### 3.18 INSULATION

Anchored veneer walls shall be insulated, where shown, by installing board-type insulation on the cavity side of the inner wythe. Board type insulation shall be applied directly to the masonry or thru-wall flashing with adhesive. Insulation shall be neatly fitted between obstructions without impaling of insulation on ties or anchors. The insulation shall be applied in parallel courses with vertical joints breaking midway over the course below and shall be applied in moderate contact with adjoining units without forcing, and shall be cut to fit neatly against adjoining surfaces.

### 3.19 SPLASH BLOCKS

Splash blocks shall be located as shown.

### 3.20 POINTING AND CLEANING

After mortar joints have attained their initial set, but prior to hardening, mortar and grout daubs or splashings shall be completely removed from masonry-unit surfaces that will be exposed or painted. Before completion of the work, defects in joints of masonry to be exposed or painted shall be raked out as necessary, filled with mortar, and tooled to match existing joints. Immediately after grout work is completed, scum and stains which have percolated through the masonry work shall be removed using a high pressure stream of water and a stiff bristled brush. Masonry surfaces shall not be cleaned, other than removing excess surface mortar, until mortar in joints has hardened. Masonry surfaces shall be left clean, free of mortar daubs, dirt, stain, and discoloration, including scum from cleaning operations, and with tight mortar joints throughout. Metal tools and metal brushes shall not be used for cleaning.

#### 3.20.1 Concrete Masonry Unit and Concrete Brick Surfaces

Exposed concrete masonry unit and concrete brick surfaces shall be dry-brushed at the end of each day's work and after any required pointing, using stiff-fiber bristled brushes.

#### 3.20.2 Clay or Shale Brick Surfaces

Exposed clay or shale brick masonry surfaces shall be cleaned as necessary to obtain surfaces free of stain, dirt, mortar and grout daubs, efflorescence, and discoloration or scum from cleaning operations. After cleaning, the sample panel of similar material shall be examined for discoloration or stain as a result of cleaning. If the sample panel is discolored or stained, the method of cleaning shall be changed to assure that the masonry surfaces in the structure will not be adversely affected. The exposed masonry surfaces shall be water-soaked and then cleaned with a solution proportioned 30 milliliters trisodium phosphate and 30 milliliters laundry detergent to 1 liter of water or cleaned with a proprietary masonry cleaning agent specifically recommended for the color and texture by the clay products manufacturer. The solution shall be applied with stiff fiber brushes, followed immediately by thorough rinsing with clean water. Proprietary cleaning agents shall be used in conformance with the cleaning product manufacturer's printed recommendations. Efflorescence shall be removed in conformance with the brick manufacturer's recommendations.

### 3.21 BEARING PLATES

Bearing plates for beams, joists, joist girders and similar structural members shall be set to the proper line and elevation with damp-pack bedding mortar, except where non-shrink grout is indicated. Bedding mortar and non-shrink grout shall be as specified in Section 03300 CAST-IN-PLACE

## STRUCTURAL CONCRETE.

## 3.22 PROTECTION

Facing materials shall be protected against staining. Top of walls shall be covered with nonstaining waterproof covering or membrane when work is not in progress. Covering of the top of the unfinished walls shall continue until the wall is waterproofed with a complete roof or parapet system. Covering shall extend a minimum of 600 mm down on each side of the wall and shall be held securely in place. Before starting or resuming, top surface of masonry in place shall be cleaned of loose mortar and foreign material.

## 3.23 TEST REPORTS

## 3.23.1 Field Testing of Mortar

At least three specimens of mortar shall be taken each day. A layer of mortar 13 to 16 mm thick shall be spread on the masonry units and allowed to stand for one minute. The specimens shall then be prepared and tested for compressive strength in accordance with ASTM C 780.

## 3.23.2 Field Testing of Grout

Field sampling and testing of grout shall be in accordance with the applicable provisions of ASTM C 1019. A minimum of three specimens of grout per day shall be sampled and tested. Each specimen shall have a minimum ultimate compressive strength of AM 1 20 MPa at 28 days.

## 3.23.3 Efflorescence Test

Brick which will be exposed to weathering shall be tested for efflorescence. Tests shall be scheduled far enough in advance of starting masonry work to permit retesting if necessary. Sampling and testing shall conform to the applicable provisions of ASTM C 67. Units meeting the definition of "effloresced" will be subject to rejection.

## 3.23.4 Prism Tests

At least one prism test sample shall be made for each 465 square meters of wall but not less than three such samples shall be made for any building. Three prisms shall be used in each sample. Prisms shall be tested in accordance with ASTM E 447. Seven-day tests may be used provided the relationship between the 7- and 28-day strengths of the masonry is established by the tests of the materials used. Compressive strength shall not be less than 20 MPa (3000 psi) at 28 days. If the compressive strength of any prism falls below the specified value by more than 3.5 MPa, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. If the likelihood of low-strength masonry is confirmed and computations indicate that the load-carrying capacity may have been significantly reduced, tests of cores drilled, or prisms sawed, from the area in question may be required. In such case, three specimens shall be taken for each prism test more than 3.5 MPa below the specified value. Masonry in the area in question shall be considered structurally adequate if the average compressive strength of three specimens is equal to at least 85 percent of the specified value, and if the compressive strength of no single specimen is less than 75 percent of the specified value. Additional testing of specimens extracted from locations represented by erratic core or prism strength test results shall be permitted.

-- End of Section --

SECTION 05500

MISCELLANEOUS METAL

07/97

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45 (1997) Designation System for Aluminum  
Finishes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A14.3 (1992) Ladders - Fixed - Safety  
Requirements

ANSI MH28.1 (1982) Design, Testing, Utilization, and  
Application of Industrial Grade Steel  
Shelving

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M (1997a<sup>1</sup>) Carbon Structural Steel

ASTM A 53 (1999b) Pipe, Steel, Black and Hot-Dipped,  
Zinc-Coated, Welded and Seamless

ASTM A 123/A 123M (1997a<sup>1</sup>) Zinc (Hot-Dip Galvanized)  
Coatings on Iron and Steel Products

ASTM A 283/A 283M (1998) Low and Intermediate Tensile  
Strength Carbon Steel Plates

ASTM A 467/A 467M (1998) Machine and Coil Chain

ASTM A 475 (1998)

## Zinc-Coated Steel Wire Strand

ASTM A 500	(1999) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 653/A 653M	(1999) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924/A 924M	(1999) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 26/B 26M	(1998) Aluminum-Alloy Sand Castings
ASTM B 221	(1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 221M	(1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM B 429	(1995) Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM D 2047	(1993) Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
ASTM F 1267	(1997) Metal, Expanded, Steel

## AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(1995) Minimum Design Loads for Buildings and Other Structures
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## AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel
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## COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-344	(Rev B) Lacquer, Clear Gloss, Exterior, Interior
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## NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM MBG 531	(1994) Metal Bar Grating Manual
NAAMM MBG 532	(1994) Heavy Duty Metal Bar Grating Manual

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 211	(1996; Errata 96-1) Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances
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## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When

used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-02 Shop Drawings

Miscellaneous Metal Items; .

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for all welds

#### SD-03 Product Data

Access Doors and Panels;  
Chimneys, Vents, and Smoke Stacks;  
Corner Guards and Shields;  
Door Guards;  
Pipe Guards;  
Down Spout Boots;  
Expansion Joint Covers;  
Handrails;  
Ladders;  
Mirror Frames;  
Miscellaneous;  
Roll Up Floor Mats;  
Safety Chains;  
Safety Nosing;  
Steel Door Frames;

### 1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123/A 123M, ASTM A 653/A 653M, or ASTM A 924/A 924M, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

### 1.4 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

### 1.5 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed

connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

#### 1.6 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

#### 1.7 ALUMINUM FINISHES

Unless otherwise specified, aluminum items shall have standard mill finish. The thickness of the coating shall be not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations in AA DAF-45. Items to be anodized shall receive a polished satin finish. Aluminum surfaces to be in contact with plaster or concrete during construction shall be protected with a field coat conforming to CID A-A-344.

#### 1.8 SHOP PAINTING

Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

### PART 2 PRODUCTS

#### 2.1 ACCESS DOORS AND PANELS

Doors and panels shall be flush type unless otherwise indicated. Frames for access doors shall be fabricated of not lighter than 1.52 mm (16 gauge) steel with welded joints and finished with anchorage for securing into construction. Access doors shall be a minimum of AM 1 - 700 by 700 mm and of not lighter than 1.9 mm (14 gauge) steel, with stiffened edges, complete with attachments. Access doors shall be hinged to frame and provided with a flush face, screw driver operated latch. Exposed metal surfaces shall have a AM 1 shop applied prime coat.

#### AM 1 2.2 EXPANSION JOINT COVERS

Expansion joint covers shall be constructed of extruded aluminum with anodized satin finish for walls and ceilings and with standard mill finish for floor covers and exterior covers. Plates, backup angles, expansion filler strip and anchors shall be designed as indicated. Expansion joint system shall provide a 1 hour fire rating.

#### 2.3 AM 1 FLOOR GRATINGS AND FRAMES

Aluminum grating shall be designed in accordance with NAAMM MBG 532 to meet the indicated load requirements. Edges shall be banded with bars 6 mm less in height than bearing bars for grating sizes above 19 mm. Banding

bars shall be flush with the top of bearing grating. Frames shall be of welded steel construction finished to match the grating.

## 2.4 HANDRAILS

Handrails shall be designed to resist a concentrated load of 890 N (200 pounds) in any direction at any point of the top of the rail or 292 Newtons per meter (20 pounds per foot) applied horizontally to top of the rail, whichever is more severe.

### 2.4.1 Steel Handrails, Including Carbon Steel Inserts

Steel handrails, including inserts in concrete, shall be steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Steel railings shall be 40 mm nominal size. Railings shall be hot-dip galvanized. Pipe collars shall be hot-dip galvanized steel.

- a. Joint posts, rail, and corners shall be fabricated by one of the following methods:

- (1) Flush type rail fittings of commercial standard, welded and ground smooth with railing splice locks secured with 10 mm hexagonal recessed-head setscrews.

- (2) Mitered and welded joints by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth. Railing splices shall be butted and reinforced by a tight fitting interior sleeve not less than 150 mm long.

- (3) Railings may be bent at corners in lieu of jointing, provided bends are made in suitable jigs and the pipe is not crushed.

- b. Removable sections, toe-boards, and brackets shall be provided as indicated.

## 2.5 LADDERS

Ladders shall be galvanized steel or aluminum, fixed rail type AM 1 with safety cage and lockable security device at approximately 2100 mm above finish grade, in accordance with ANSI A14.3.

## 2.6 AM 1 METAL GRID WALKWAYS

Metal grid walkways shall be designed to protect rooftops from pedestrian traffic and shall be 2.0 mm (12 gauge) minimum aluminum. The walkway shall consist of metal planks, 610 by 3050 or 3650 mm, bolted or welded to support stands. Other sizes may be furnished if approved. In addition to end supports, a midspan support shall be provided when required to limit deflection. End supports shall be located to avoid uplift and to provide continuous runs. All support members shall extend through roof penetrations to structural members below the roof insulation. AM 1 2.7

## MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames, shall be provided to complete the work.

## 2.8 ROLL-UP FLOOR MATS

Roll-up mats shall be of aluminum construction with serrated aluminum surface. Roll-up mats shall be for use in recessed area. Construction

details of recessed areas shall be shown on the drawings.

## 2.9 SAFETY CHAINS

Safety chains shall be galvanized welded steel, proof coil chain tested in accordance with ASTM A 467/A 467M, Class CS. Safety chains shall be straight link style, 5 mm diameter, minimum 39 links per meter (12 links per foot) and with bolt type snap hooks on each end. Eye bolts for attachment of chains shall be galvanized 10 mm bolt with 19 mm eye, anchored as indicated. Two chains shall be furnished for each guarded opening.

## 2.10 SAFETY NOSING

Safety nosings shall be of cast iron with cross-hatched, abrasive surface. Nosing shall be 75 mm wide and terminating at not more than 150 mm from the ends of treads, except nosing for metal pan cement-filled treads shall extend the full length of the tread. Safety nosings shall be provided with anchors not less than 19 mm long. Integrally cast mushroom anchors are not acceptable.

## 2.11 STEEL DOOR FRAMES

Steel door frames AM 1 , for Engine Repair Shop Doors, built from structural shapes shall be neatly mitered and securely welded at the corners with all welds ground smooth. Jambs shall be provided with 50 by 6 by 300 mm bent, adjustable metal anchors spaced not over 760 mm on centers. Provision shall be made to stiffen the top member for all spans over 900 mm. Continuous door stops shall be made of 38 by 16 mm AM 1 bar stock.

# PART 3 EXECUTION

## 3.1 GENERAL INSTALLATION REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified.

## 3.2 REMOVABLE ACCESS AM 1 DOORS AND PANELS

A removable access panel not less than AM 1 700 by 700 shall be installed directly below each valve, flow indicator, damper, or air splitter that is located above the ceiling, other than an acoustical ceiling, and that would otherwise not be accessible.

## AM 1 3.3 ATTACHMENT OF HANDRAILS

Toeboards and brackets shall be installed where indicated. Splices, where required, shall be made at expansion joints. Removable sections shall be installed as indicated.

### 3.3.1 Installation of Steel Handrails

Installation shall be in pipe sleeves embedded in concrete and filled with molten lead or sulphur with anchorage covered with standard pipe collar pinned to post or by means of pipe sleeves secured with expansion shields and bolts or toggle bolts. AM 1

## 3.4 RECESSED FLOOR MATS

Contractor shall verify field measurements prior to releasing materials for fabrication by the manufacturer. A mat frame shall be used to ensure

recess accuracy in size, shape and depth. Drain pit shall be formed by blocking out concrete when frames are installed. Pit shall be dampproofed after concrete has set. Frames shall be assembled onsite and installed so that upper edge will be level with finished floor surface. A cement base shall be screeded inside the mat recess frame area using the edge provided by the frame as a guide. The frame shall be anchored into the cement with anchor pins a minimum of 610 mm on centers.

### 3.5 MOUNTING OF SAFETY CHAINS

Safety chains shall be mounted AM 1 - 1000mm mm and 570mm above finish floor, as appropriate to the location.

### 3.6 INSTALLATION OF SAFETY NOSINGS

Nosing shall be completely embedded in concrete before the initial set of the concrete occurs and shall finish flush with the top of the concrete surface.

### 3.7 DOOR FRAMES

Door frames shall be secured to the floor slab by means of angle clips and expansion bolts. Continuous door stops shall be welded to the frame or tap screwed with countersunk screws at no more than 450 mm centers, assuring in either case full contact with the frame. Any necessary reinforcements shall be made and the frames shall be drilled and tapped as required for hardware.

#### AM 1

-- End of Section --

SECTION 06100

ROUGH CARPENTRY

09/96

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN FOREST & PAPER ASSOCIATION (AF&PA)

AF&PA T01 (1991; Supple 1993; Addenda Apr 1997;  
Supple T02) National Design Specification  
for Wood Construction

AF&PA T11 (1988) Manual for Wood Frame Construction

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA A135.4 (1995) Basic Hardboard

AHA A194.1 (1985) Cellulosic Fiber Board

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)

AITC TC Manual (1994) Timber Construction Manual

AITC 109 (1990) Standard for Preservative Treatment  
of Structural Glued Laminated Timber

AITC 111 (1979) Recommended Practice for Protection  
of Structural Glued Laminated Timber  
During Transit, Storage and Erection

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A208.1 (1999) Particleboard Mat Formed Woods

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 79/C 79M (1997) Treated Core and Nontreated Core  
Gypsum Sheathing Board

ASTM C 208 (1995) Cellulosic Fiber Insulating Board

ASTM C 516 (1980; R 1996e1) Vermiculite Loose Fill  
Thermal Insulation

ASTM C 518 (1998) Steady-State Heat Flux Measurements  
and Thermal Transmission Properties By  
Means of the Heat Flow Meter Apparatus

ASTM C 549	(1981; R 1995e1) Perlite Loose Fill Insulation
ASTM C 552	(1991) Cellular Glass Thermal Insulation
ASTM C 553	(1992) Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM C 578	(1995) Rigid, Cellular Polystyrene Thermal Insulation
ASTM C 591	(1994) Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C 612	(1993) Mineral Fiber Block and Board Thermal Insulation
ASTM C 665	(1998) Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM C 726	(1993) Mineral Fiber Roof Insulation Board
ASTM C 739	(1997) Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation
ASTM C 764	(1998) Mineral Fiber Loose-Fill Thermal Insulation
ASTM C 1136	(1995) Flexible, Low Permeance Vapor Retarders for Thermal Insulation
ASTM C 1177/C 1177M	(1996) Glass Mat Gypsum Substrate for Use as Sheathing
ASTM C 1289	(1998) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM D 2898	(1999) Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing
ASTM E 84	(1999) Surface Burning Characteristics of Building Materials
ASTM E 96	(1995) Water Vapor Transmission of Materials
ASTM E 154	(1988; R 1999) Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
ASTM F 547	(1977; R 1995) Definitions of Terms Relating to Nails for Use with Wood and Wood-Base Materials

## AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

AWPA C2	(1995) Lumber, Timber, Bridge Ties and
---------	--

Mine Ties - Preservative Treatment by  
Pressure Processes

AWPA C9 (1997) Plywood - Preservative Treatment by  
Pressure Processes

AWPA C20 (1996) Structural Lumber Fire-Retardant  
Pressure Treatment

AWPA C27 (1996) Plywood - Fire-Retardant Pressure  
Treatment

AWPA M4 (1996) Standard for the Care of  
Preservative-Treated Wood Products

AWPA P5 (1997) Standards for Waterborne  
Preservatives

CODE OF FEDERAL REGULATIONS (CFR)

16 CFR 1209 Interim Safety Standard for Cellulose  
Insulation

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1 (1996) Voluntary Product Standard -  
Construction and Industrial Plywood

DOC PS 2 (1992) Performance Standards for  
Wood-Based Structural-Use Panels

FACTORY MUTUAL ENGINEERING AND RESEARCH (FM)

FM LPD 1-49 (1995) Loss Prevention Data Sheet -  
Perimeter Flashing

NATIONAL HARDWOOD LUMBER ASSOCIATION (NHLA)

NHLA Rules (1994) Rules for the Measurement &  
Inspection of Hardwood & Cypress

NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA)

NELMA Grading Rules (1997) Standard Grading Rules for  
Northeastern Lumber

SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION (SCMA)

SCMA Specs (1986; Supple No. 1, Aug 1993) Standard  
Specifications for Grades of Southern  
Cypress

SOUTHERN PINE INSPECTION BUREAU (SPIB)

SPIB Rules (1994; Supple 8 thru 11) Standard Grading  
Rules for Southern Pine Lumber

WEST COAST LUMBER INSPECTION BUREAU (WCLIB)

WCLIB Std 17 (1996; Supples VII(A-E), VIII(A-C))  
Grading Rules for West Coast Lumber

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

## WWPA Grading Rules

(1999) Western Lumber Grading Rules 95

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-03 Product Data

Lumber and Sheathing;  
Insulation;  
Vapor Retarder;  
Air Infiltration Barrier;  
Insulation;

Certificate attesting that the cellulose, perlite, glass and mineral fiber, glass mat gypsum roof board, polyurethane, or polyisocyanurate insulation furnished for the project contains recovered material, and showing an estimated percent of such recovered material.

## 1.3 DELIVERY AND STORAGE

Materials shall be delivered to the site in undamaged condition, stored off ground in fully covered, well ventilated areas, and protected from extreme changes in temperature and humidity. Laminated timber shall be handled and stored in accordance with AITC 111 or APA EWS R540C.

## PART 2 PRODUCTS

## 2.1 LUMBER AND SHEATHING

## 2.1.1 Grading and Marking

## 2.1.1.1 Lumber Products

Solid sawn and finger-jointed lumber shall bear an authorized gradestamp or grademark recognized by ALSC, or an ALSC recognized certification stamp, mark, or hammerbrand. Surfaces that are to be exposed to view shall not bear grademarks, stamps, or any type of identifying mark. Hammer marking will be permitted on timbers when all surfaces will be exposed to view.

## 2.1.1.2 Plywood and Other Sheathing Products

Materials shall bear the grademark or other identifying marks indicating grades of material and rules or standards under which produced, including requirements for qualifications and authority of the inspection organization. Except for plywood and wood structural panels, bundle marking will be permitted in lieu of marking each individual piece. Surfaces that are to be exposed to view shall not bear grademarks or other types of identifying marks.

## 2.1.2 Sizes

Lumber and material sizes shall conform to requirements of the rules or standards under which produced. Unless otherwise specified, lumber shall be surfaced on four sides. Unless otherwise specified, sizes indicated are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

### 2.1.3 Treatment

Exposed areas of treated wood that are cut or drilled after treatment shall receive a field treatment in accordance with AWPA M4. Items of all-heart material of cedar, cypress, or redwood will not require preservative treatment, except when in direct contact with soil. Except as specified for all-heart material of the previously mentioned species, the following items shall be treated:

- a. Wood members in contact with or within 455 mm of soil.
- b. Wood members in contact with water.
- c. Wood members exposed to the weather including those used in builtup roofing systems or as nailing strips or nailers over fiberboard or gypsum-board wall sheathing as a base for wood siding.
- d. Wood members set into concrete regardless of location, including flush-with-deck wood nailers for roofs.
- e. Wood members in contact with concrete that is in contact with soil or water or that is exposed to weather.

#### 2.1.3.1 Lumber and Timbers

Lumber and timbers shall be treated in accordance with AWPA C2 with waterborne preservatives listed in AWPA P5 to a retention level as follows:

- a. 4 kg per cubic meter (0.25 pcf) intended for above ground use.
- b. 6.4 kg per cubic meter (0.40 pcf) intended for ground contact and fresh water use.

#### 2.1.3.2 Plywood

Plywood shall be treated in accordance with AWPA C9 with waterborne preservatives listed in AWPA P5 to a retention level as follows:

- a. 4 kg per cubic meter (0.25 pcf) intended for above ground use.
- b. 6.4 kg per cubic meter (0.40 pcf) intended for ground contact and fresh water use.

### 2.1.4 Moisture Content

At the time lumber and other materials are delivered and when installed in the work their moisture content shall be as follows:

- a. Treated and Untreated Lumber Except Roof Planking: 100 mm or less, nominal thickness, 19 percent maximum. 125 mm or more, nominal thickness, 23 percent maximum in a 75 mm perimeter of the timber cross-section.
- b. Roof Planking: 15 percent maximum.
- c. Materials Other Than Lumber: In accordance with standard under which product is produced.

### 2.1.5 Fire-Retardant Treatment

Fire-retardant treated wood shall be pressure treated in accordance with AWPA C20 for lumber and AWPA C27 for plywood. Material use shall be

defined in AWPAC 20 and AWPAC 27 for Interior Type [A] [and] [B] and Exterior Type. Treatment and performance inspection shall be by an independent and qualified testing agency that establishes performance ratings. Each piece or bundle of treated material shall bear identification of the testing agency to indicate performance in accordance with such rating. Treated materials to be exposed to rain wetting shall be subjected to an accelerated weathering technique in accordance with ASTM D 2898 prior to being tested for compliance with AWPAC 20 or AWPAC 27.

#### 2.1.1.6 Structural Wood Members

#### 2.1.1.7 Sheathing

Sheathing shall be fiberboard, gypsum board, plywood, wood structural panels, or wood for wall sheathing; and plywood, wood structural panels, or wood for roof sheathing.

##### 2.1.1.7.1 Fiberboard

Fiberboard shall conform to ASTM C 208, Type IV, Grade 2, Structural Grade, or AHA A194.1, Type IV, Grade 2 asphalt impregnated or asphalt coated to be water-resistant but vapor permeable.

##### 2.1.1.7.2 Gypsum Sheathing Board

Glass mat gypsum sheathing shall conform to ASTM C 79/C 79M and ASTM C 1177/C 1177M. Gypsum board shall conform to ASTM C 79/C 79M, 13 mm thick (1/2 inch thick), 1200 mm wide with straight edges for supports 400 mm on center without corner bracing of framing or for supports 600 mm on center with corner bracing of framing; 600 mm wide with V-tongue and groove edges for supports 400 or 600 mm on center with corner bracing of framing.

##### 2.1.1.7.3 Plywood

Plywood shall conform to DOC PS 1, APA PRP-108 or DOC PS 2, Grade C-D or sheathing grade with exterior glue. Sheathing for roof and walls without corner bracing of framing shall have a span rating of 16/0 or greater for supports 400 mm on center and a span rating of 24/0 or greater for supports 600 mm on center.

##### 2.1.1.7.4 Wood

Species and grade shall be in accordance with TABLE I at the end of this section. Wall sheathing shall be 25 mm thick for supports 400 or 600 mm on center without corner bracing of framing provided sheathing is applied diagonally. Roof sheathing shall be 25 mm thick for supports 400 or 600 mm on center.

#### 2.1.1.8 Miscellaneous Wood Members

##### 2.1.1.8.1 Nonstress Graded Members

Members shall include bridging, corner bracing, furring, grounds, and nailing strips. Members shall be in accordance with TABLE I for the species used. Sizes shall be as follows unless otherwise shown:

Member	Size mm (inch)
Bridging	25 x 75 (1 x 3) or 25 x 100 (1 x 4) for use between members 50 x 300 (2 x 12) and smaller; 50 x 100 (2 x 4) for use between members larger than 50 x 300 (2 x 12).

Member	Size mm (inch)
Corner bracing	25 x 100 (1 x 4).
Furring	25 (1) x [50 (2)] [75 (3)]
Grounds	Plaster thickness by 38.
Nailing strips	25 x 75 (1 x 3) or 25 x 100 (1 x 4) when used as shingle base or interior finish, otherwise 50 mm (2 inch) stock.

## 2.2 INSULATION

Thermal resistance of insulation shall be not less than the R-values shown.

R-values shall be determined at 24 degrees C in accordance with ASTM C 518.

Insulation shall contain the highest practicable percentage of recovered material which has been recovered or diverted from solid waste, but not including material reused in a manufacturing process. Where two materials have the same price and performance, the one containing the higher recovered material content shall be provided. Insulation shall be the standard product of a manufacturer and factory marked or identified with manufacturer's name or trademark and R-value. Identification shall be on individual pieces or individual packages. Materials containing more than one percent asbestos will not be allowed.

### 2.2.1 Batt or Blanket

#### 2.2.1.1 Glass Fiber Batts and Rolls

Glass fiber batts and rolls **AM 1 , for use as the engine repair shop roof insulation,** shall conform to ASTM C 665, **AM 1** Type III insulation, Class A, having a UL rating of 25 and a smoke developed rating of 150 or less when tested in accordance with ASTM E 84. Insulation shall have a 0.25 mm (10 mil) thick, white, puncture resistant woven-glass cloth with vinyl facing on one side. Width and length shall suit construction conditions.

### **AM 1** 2.2.2 Rigid Insulation

#### **AM 1** 2.2.2.1 Glass Fiber Insulation Board

Glass mat gypsum roof board shall conform to ASTM C 1177/C 1177M, flame spread 0, smoke developed 0, psi 500, water resistant. Glass fiber or insulation board shall conform to ASTM C 612, Type 1A with a minimum recovered material content of 6 percent by weight of glass fiber core material.

### **AM 1** 2.3 VAPOR RETARDER

Vapor retarder shall be polyethylene sheeting conforming to ASTM E 154 or other equivalent material. Vapor retarder shall have a maximum vapor permeance rating of 29 ng per Pa per second per square meter (0.5 perms) as determined in accordance with ASTM E 96, unless otherwise specified.

## 2.4 AIR INFILTRATION BARRIER

Air infiltration barrier shall be building paper meeting the requirements of ASTM C 1136, Type IV, style optional or a tear and puncture resistant olefin building wrap (polyethylene or polypropylene) with a moisture vapor transmission rate of 125 g per square meter per 24 hours in accordance with ASTM E 96, Desiccant Method at 23 degrees C or with a moisture vapor

transmission rate of 670 g per square meter per 24 hours in accordance with ASTM E 96, Water Method at 23 degrees C.

### PART 3 EXECUTION

#### 3.1 INSTALLATION OF MISCELLANEOUS WOOD MEMBERS

##### 3.1.1 Blocking

Blocking shall be provided as necessary for application of siding, sheathing, subflooring, wallboard, and other materials or building items, and to provide firestopping. Blocking for firestopping shall ensure a maximum dimension of 2400 mm for any concealed space. Blocking shall be cut to fit between framing members and rigidly nailed thereto.

##### 3.1.2 Nailers and Nailing Strips

Nailers and nailing strips shall be provided as necessary for the attachment of finish materials. Nailers used in conjunction with roof deck installation shall be installed flush with the roof deck system. Stacked nailers shall be assembled with spikes or nails spaced not more than 450 mm on center and staggered. Beginning and ending nails shall not be more than 150 mm for nailer end. Ends of stacked nailers shall be offset approximately 300 mm in long runs and alternated at corners. Anchors shall extend through the entire thickness of the nailer. Strips shall be run in lengths as long as practicable, butt jointed, cut into wood framing members when necessary, and rigidly secured in place. Nailers and nailer installation for Factory Mutual wind uplift rated roof systems specified in other Sections of these specifications shall conform to the recommendations contained in FM LPD 1-49.

##### 3.1.3 Furring Strips

Furring strips shall be provided at the locations shown. Furring strips shall be installed at 400 mm on center unless otherwise shown, run in lengths as long as practicable, butt jointed and rigidly secured in place.

#### 3.2 INSTALLATION OF INSULATION

Insulation shall be installed after construction has advanced to a point that the installed insulation will not be damaged by remaining work. For thermal insulation the actual installed thickness shall provide the thermal resistance shown. For acoustical insulation the installed thickness shall be as shown. Insulation shall be installed on the weather side of such items as electrical boxes and water lines. Unless otherwise specified, installation shall be in accordance with the manufacturer's recommendation.

#### 3.3 INSTALLATION OF VAPOR RETARDER

Vapor retarder shall be applied to provide a continuous barrier at window and door frames, and at all penetrations such as electrical outlets and switches, plumbing connections, and utility service penetrations. Joints in the vapor retarder shall be lapped and sealed according to the manufacturer's recommendations.

#### 3.4 INSTALLATION OF AIR INFILTRATION BARRIER

Air infiltration barrier shall be installed in accordance with the manufacturer's recommendations.

3.5 TABLES

TABLE I. SPECIES AND GRADE

Subflooring, Roof Sheathing, Wall Sheathing, Furring						
Grading Rules	Species	Const Standard	No. 2 Comm	No. 2 Board Comm	No. 3 Comm	
NHLA Rules	Cypress			X		
NELMA Grading Rules	Northern White Cedar					X
	Eastern White Pine	X				
	Northern Pine	X				
	Balsam Fir					X
	Eastern Hemlock-Tamarack					X
CRA RIS-01-SS	Redwood		X			
SCMA Specs	Cypress			X		
SPIB Rules	Southern Pine		X			
WCLIB Std 17	Douglas Fir-Larch	X				
	Hem-Fir	X				
	Sitka Spruce	X				
	Mountain Hemlock	X				
	Western Cedar	X				
WWPA Grading Rules	Douglas Fir-Larch	X				
	Hem-Fir	X				
	Idaho White Pine	X				
	Lodgepole Pine			X		
	Ponderosa Pine			X		
	Sugar Pine			X		
	Englemann Spruce			X		
	Douglas Fir South			X		
	Mountain Hemlock			X		
	Subalpine Fir			X		
	Western Cedar			X		

TABLE II. SPECIES AND GRADE

Wood Bumpers			
Grading Rules	Species	No. 1	No. 2
NHLA Rules	Red Oak	X	
NELMA Grading Rules	Northern Pine		X

TABLE II. SPECIES AND GRADE

Wood Bumpers			
Grading Rules	Species	No. 1	No. 2
	Eastern Hemlock-		X
	Tamarack		
SPIB Rules	Southern Pine	X	
WCLIB Std 17	Douglas Fir-Larch		X
	Hem-Fir		X
WWPA Grading Rules	Douglas Fir-Larch		X
	Hem-Fir		X
	Douglas Fir-South		X

-- End of Section --

SECTION 07416

STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM

10/98

Amendment 0001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA Design Manual	(2000) Aluminum Design Manual: Specification & Guidelines for Aluminum Structures
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AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC ASD Spec S335	(1989) Specification for Structural Steel Buildings - Allowable Stress Design, Plastic Design
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AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI Cold-Formed Mn1	(1996) Cold-Formed Steel Design Manual
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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 463/A 463M	(1999a) Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM A 653/A 653M	(1999a) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 792/A 792M	(1999) Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM B 209	(1996) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 209M	(1995) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM C 518	(1998) Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C 991	(1998) Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings
ASTM C 1177/C 1177M	(1999) Glass Mat Gypsum Substrate for Use as Sheathing
ASTM C 1289	(1998) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

ASTM D 522	(1993a) Mandrel Bend Test of Attached Organic Coatings
ASTM D 523	(1989; R 1999) Specular Gloss
ASTM D 610	(1995) Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM D 714	(1987; R 1994e1) Evaluating Degree of Blistering of Paints
ASTM D 968	(1993) Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D 1308	(1987; R 1998) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D 1654	(1992) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
ASTM D 1970	(2000) Standard Specifications for Self-Adhering Polymer Modified Bituminous Sheet Material Used as Steep Roofing Underlayment for Ice Dam Protection.
ASTM D 2244	(1995) Calculation of Color Differences from Instrumentally Measured Color Coordinates
ASTM D 2247	(1999) Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM D 2794	(1993; R 1999e1) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3359	(1997) Measuring Adhesion by Tape Test
ASTM D 4214	(1998) Evaluating Degree of Chalking of Exterior Paint Films
ASTM D 4397	(1996) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM D 4587	(1991) Conducting Tests on Paint and Related Coatings and Materials Using a Fluorescent UV-Condensation Light- and Water-Exposure Apparatus
ASTM D 5894	(1996) Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
ASTM E 84	(1999) Surface Burning Characteristics of Building Materials
ASTM E 96	(1995) Water Vapor Transmission of Materials

ASTM E 1592 (1998) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (1998) Minimum Design Loads for Buildings and Other Structures

STEEL JOIST INSTITUTE (SJI)

SJI Specs & Tables (1994) Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders

## 1.2 GENERAL REQUIREMENTS

The Contractor shall furnish a commercially available roofing system which satisfies all requirements contained herein and has been verified by load testing and independent design analyses to meet the specified design requirements.

### 1.2.1 Structural Standing Seam Metal Roof (SSSMR) System

The SSSMR system covered under this specification shall include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, skylights; interior or exterior gutters and downspouts; fascia covers, eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system.

### 1.2.2 Manufacturer

The SSSMR system shall be the product of a manufacturer who has been in the practice of manufacturing and designing SSSMR systems for a period of not less than 3 years and has been involved in at least five projects similar in size and complexity to this project.

### 1.2.3 Installer

The installer shall be certified by the SSSMR system manufacturer to have experience in installing at least three projects that are of comparable size, scope and complexity as this project for the particular roof system furnished. The installer may be either employed by the manufacturer or be an independent installer.

## 1.3 DESIGN REQUIREMENTS

The design of the SSSMR system shall be provided by the Contractor as a complete system. Members and connections not indicated on the drawings shall be designed by the Contractor. Roof panels, components, transitions, accessories, and assemblies shall be supplied by the same roofing system manufacturer.

### 1.3.1 Design Criteria

Design criteria shall be in accordance with ASCE 7.

### 1.3.2 Dead Loads

The dead load shall be the weight of the SSSMR system. Collateral loads such as sprinklers, mechanical and electrical systems, and ceilings shall not be attached to the panels.

### 1.3.3 Live Loads

#### 1.3.3.1 Concentrated Loads

The panels and anchor clips shall be capable of supporting a 1335 N concentrated load. The concentrated load shall be applied at the panel midspan and will be resisted by a single standing seam metal roof panel assumed to be acting as a beam. The undeformed shape of the panel shall be used to determine the section properties.

#### 1.3.3.2 Uniform Loads

The panels and concealed anchor clips shall be capable of supporting a minimum uniform live load of 960 Pa.

### 1.3.4 Roof Snow Loads

The design roof snow loads shall be as shown on the contract drawings.

### 1.3.5 Wind Loads

The design wind uplift pressure for the roof system shall be as shown on the contract drawings. The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below shall be applied to the design force and compared against the ultimate capacity. Prying shall be considered when figuring fastener design loads.

- a. Single fastener in each connection.....3.0
- b. Two or more fasteners in each connection...2.25

### 1.3.6 Thermal Loads

Roof panels shall be free to move in response to the expansion and contraction forces resulting from a total temperature range of 85 degrees C during the life of the structure.

### 1.3.7 Framing Members Supporting the SSSMR System

Any additions/revisions to framing members supporting the SSSMR system to accommodate the manufacturer/fabricator's design shall be the Contractor's responsibility and shall be submitted for review and approval. New or revised framing members and their connections shall be designed in accordance with AISC ASD Spec S335, AISI Cold-Formed Mnl, or SJI Specs & Tables. Maximum deflection under applied live load, snow, or wind load shall not exceed 1/180 of the span length.

### 1.3.8 Roof Panels Design

Steel panels shall be designed in accordance with AISI Cold-Formed Mnl. The structural section properties used in the design of the panels shall be determined using the unloaded shape of the roof panels. The calculated panel deflection from concentrated loads shall not exceed 1/180 of the span length. The calculated panel deflection under applied live load, snow, or

wind load shall not exceed 1/180 times the span length. Deflections shall be based on panels being continuous across three or more supports. Deflection shall be calculated and measured along the major ribs of the panels.

#### 1.3.9 Accessories and Their Fasteners

Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the roof panel system. Exposed fasteners shall not restrict free movement of the roof panel system resulting from thermal forces. There shall be a minimum of two fasteners per clip. Single fasteners with a minimum diameter of 9 mm will be allowed when the supporting structural members are prepunched or predrilled.

#### 1.4 PERFORMANCE REQUIREMENTS

The SSSMR shall be tested for wind uplift resistance in accordance with ASTM E 1592; SSSMR systems previously tested and approved by the Corps of Engineers' STANDARD TEST METHOD FOR STRUCTURAL PERFORMANCE OF SSMRS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE may be acceptable. Two tests shall be performed. Test 1 shall simulate the edge condition with one end having crosswise restraint and other end free of crosswise restraint. The maximum span length for the edge condition shall be 750 mm. Test 2 shall simulate the interior condition with both ends free of crosswise restraint. The maximum span length for the interior condition shall be 1.5 m. Internal adhesive and external reinforcement, such as clamps on the ribs, shall not be installed to improve uplift resistance. Bolts through seams shall not be installed.

#### 1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

##### SD-02 Drawings

Structural Standing Seam Metal Roof System; G, RE.

Metal roofing drawings and specifications and erection drawings; shop coating and finishing specifications; and other data as necessary to clearly describe design, materials, sizes, layouts, standing seam configuration, construction details, provisions for thermal movement, line of panel fixity, fastener sizes and spacings, sealants and erection procedures. Drawings shall reflect the intent of the architectural detailing using the manufacturer's proprietary products and fabricated items as required. The SSSMR system shop drawings shall be provided by the metal roofing manufacturer.

##### SD-03 Product Data

Design Analysis; G, RE.

Design analysis signed by a Registered Professional Engineer employed by the SSSMR manufacturer. The design analysis shall include a list of the design loads, and complete calculations for the support system (including purlin splices and bracing), roofing system and its components; valley designs, gutter/downspout calculations, screw pullout test results, and

shall indicate how expected thermal movements are accommodated.

Qualifications; FIO, .

Qualifications of the manufacturer and installer.

#### SD-04 Samples

Accessories; FIO, .

One sample of each type of flashing, trim, closure, thermal spacer block, cap and similar items. Size shall be sufficient to show construction and configuration.

Roof Panels; FIO, .

One piece of each type to be used, 225 mm long, full width.

Factory Color Finish; FIO, .

Three 75 by 125 mm samples of each type and color.

Fasteners; FIO, .

Two samples of each type to be used, with statement regarding intended use. If so requested, random samples of bolts, nuts, and washers as delivered to the job site shall be taken in the presence of the Contracting Officer and provided to the Contracting Officer for testing to establish compliance with specified requirements.

Insulation; FIO, .

One piece, 300 by 300 mm, of each type and thickness to be used, with a label indicating the rated permeance (if faced) and R-values. The flame spread, and smoke developed rating shall be shown on the label or provided in a letter of certification.

Gaskets and Insulating Compounds; FIO, .

Two samples of each type to be used and descriptive data.

Sealant; FIO, .

One sample, approximately 0.5 kg, and descriptive data.

Concealed Anchor Clips; FIO, .

Two samples of each type used.

Subpurlins; FIO, .

One piece, 225 mm long.

EPDM Rubber Boots; FIO, .

One piece of each type.

#### SD-06 Test Reports

Test Report for Uplift Resistance of the SSSMR; G, RE.

The report shall include the following information:

- a. Details of the SSSMR system showing the roof panel cross-section with dimensions and thickness.
- b. Details of the anchor clip, dimensions, and thickness.
- c. Type of fasteners, size, and the number required for each connection.
- d. Purlins/subpurlins size and spacing used in the test.
- e. Description of the seaming operation including equipment used.
- f. Maximum allowable uplift pressures. These pressures are determined from the ultimate load divided by a factor of safety equal to 1.65.
- g. Any additional information required to identify the SSSMR system tested.
- h. Signature and seal of an independent registered engineer who witnessed the test.

#### SD-07 Certificates

Structural Standing Seam Metal Roof System; FIO, .

- a. Certification that the actual thickness of uncoated sheets used in SSSMRS components including roofing panels, purlins/subpurlins, and concealed anchor clips complies with specified requirements.
- b. Certification that materials used in the installation are mill certified.
- c. Previous certification of SSSMR system tested under the Corps of Engineers' Standard Test Method in lieu of ASTM E 1592 testing.
- d. Certification that the sheets to be furnished are produced under a continuing quality control program and that a representative sample consisting of not less than three pieces has been tested and has met the quality standards specified for factory color finish.
- e. Certification of installer. Installer certification shall be furnished.
- f. Warranty certificate. At the completion of the project the Contractor shall furnish signed copies of the 5-year Warranty for Structural Standing Seam Metal Roof (SSSMR) System, a sample copy of which is attached to this section, the 20-year Manufacturer's Material Warranties, the manufacturer's 20-year system weathertightness warranty, and the roofing system bond.

Insulation; FIO, .

Certificate attesting that the polyurethane or polyisocyanurate insulation furnished for the project contains recovered material, and showing an estimated percent of such recovered material.

#### 1.6 DELIVERY AND STORAGE

Materials shall be delivered to the site in a dry and undamaged condition and stored out of contact with the ground. Materials shall be covered with weathertight coverings and kept dry. Storage conditions shall provide good air circulation and protection from surface staining.

#### 1.7 WARRANTIES

The SSSMR system shall be warranted as outlined below. Any emergency temporary repairs conducted by the owner shall not negate the warranties.

##### 1.7.1 Contractor's Weathertightness Warranty

The SSSMR system shall be warranted by the Contractor on a no penal sum basis for a period of five years against material and workmanship deficiencies; system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The SSSMR system covered under this warranty shall include the entire roofing system including, but not limited to, the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, and skylights; interior or exterior gutters and downspouts; fascia covers, eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system; and items specified in other sections of these specifications that are part of the SSSMR system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements and/or inadequate resistance to specified design loads, water leaks and wind uplift damage shall be repaired as approved by the Contracting Officer. See the attached Contractor's required warranty for issue resolution of warrantable defects.

This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractor shall supplement this warranty with written warranties from the installer and system manufacturer, which shall be submitted along with Contractor's warranty; however, the Contractor shall be ultimately responsible for this warranty. The Contractor's written warranty shall be as outlined in attached WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM, and shall start upon final acceptance of the facility. It is required that the Contractor provide a separate bond in an amount equal to the installed total roofing system cost in favor of the owner (Government) covering the Contractor's warranty responsibilities effective throughout the five year Contractor's warranty period for the entire SSSMR system as outlined above.

##### 1.7.2 Manufacturer's Material Warranties.

The Contractor shall furnish, in writing, the following manufacturer's material warranties which cover all SSSMR system components such as roof panels, anchor clips and fasteners, flashing, fascia covers, accessories, and trim, fabricated from coil material:

a. A manufacturer's 20 year material warranty warranting that the aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel as specified herein will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed coil material.

b. A manufacturer's 20 year exterior material finish warranty on the factory colored finish warranting that the finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight, as determined by ASTM D 4214 test procedures; or change color in excess of five CIE or Hunter Lab color difference ( $\Delta E$ ) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to refinishing with an air-drying version of the specified finish or replacing the defective coated material.

c. A roofing system manufacturer's 20 year system weathertightness warranty.

## 1.8 COORDINATION MEETING

A coordination meeting shall be held 30 days prior to the first submittal, for mutual understanding of the Structural Standing Seam Metal Roof (SSSMR) System contract requirements. This meeting shall take place at the building site and shall include representatives from the Contractor, the roof system manufacturer, the roofing supplier, the erector, the SSSMR design engineer of record, and the Contracting Officer. All items required by paragraph SUBMITTALS shall be discussed, including applicable standard manufacturer shop drawings, and the approval process. The Contractor shall coordinate time and arrangements for the meeting.

## PART 2 PRODUCTS

### 2.1 ROOF PANELS

Panels shall be steel and shall have a factory color finish. Length of sheets shall be sufficient to cover the entire length of any unbroken roof slope for slope lengths that do not exceed 9 m. When length of run exceeds 9 m and panel laps are provided, each sheet in the run shall extend over three or more supports. Sheets longer than 30 m may be furnished if approved by the Contracting Officer. Width of sheets shall provide not more than 600 mm of coverage in place. SSSMR system with roofing panels greater than 300 mm in width shall have standing seams rolled during installation by an electrically driven seaming machine. Height of standing seams shall be not less than 50 mm

#### 2.1.1 Steel Panels

Steel panels shall be zinc-coated steel conforming to ASTM A 653/A 653M; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 50 coating; or aluminum-coated steel conforming to ASTM A 463/A 463M, Type 2, coating designation T2 65. Zinc, zinc-aluminum alloy or aluminum coated panels shall be 0.584 mm thick minimum. Uncoated panels shall be within 95 percent of reported tested thickness as noted in wind uplift resistance testing required in paragraph PERFORMANCE REQUIREMENTS.

### 2.2 CONCEALED ANCHOR CLIPS

Concealed anchor clips shall be the same as the tested roofing system. Clip bases shall have factory punched or drilled holes for attachment. Clips shall be made from multiple pieces with the allowance for the total thermal movement required to take place within the clip. Single piece clips may be acceptable when the manufacturer can substantiate that the system can accommodate the thermal cyclic movement under sustained live or snow loads.

### 2.3 ACCESSORIES

Flashing, trim, metal closure strips, caps and similar metal accessories

shall be the manufacturer's standard products. Exposed metal accessories, gutters, downspouts, and fascia covers shall have the same metal thickness and finish system as the panels furnished. Molded closure strips shall be bituminous-saturated fiber, closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride premolded to match configuration of the panels and shall not absorb or retain water. The use of a continuous angle butted to the panel ends to form a closure will not be allowed.

## 2.4 FASTENERS

Fasteners for steel roof panels shall be zinc-coated steel, aluminum, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements. Fasteners for structural connections shall provide both tensile and shear ultimate strengths of not less than 3340 N per fastener. Fasteners for accessories shall be the manufacturer's standard. Exposed roof fasteners shall be sealed or have sealed washers on the exterior side of the roof to waterproof the fastener penetration. Washer material shall be compatible with the roofing; have a minimum diameter of 10 mm for structural connections; and gasketed portion of fasteners or washers shall be neoprene or other equally durable elastomeric material approximately 3 mm thick. Exposed fasteners for factory color finished panels shall be factory finished to match the color of the panels.

### 2.4.1 Screws

Screws for attaching anchor devices shall be not less than No. 14. Actual screw pull out test results shall be performed for the actual material gage and yield strength of the structural purlins or subpurlins to which the clip is to be anchored/attached. Other screws shall be as recommended by the manufacturer to meet the strength design requirements of the panels.

### 2.4.2 Bolts

Bolts shall be not less than 6 mm diameter, shouldered or plain shank as required, with locking washers and nuts.

### 2.4.3 Structural Blind Fasteners

Blind screw-type expandable fasteners shall be not less than 6 mm diameter. Blind (pop) rivets shall be not less than 7 mm minimum diameter.

## 2.5 PURLINS/SUBPURLINS

Cold formed supporting structural members shall have a minimum thickness of 1.5 mm and a minimum tensile yield strength of 345 MPa. Hot rolled structural members shall have a minimum thickness of 6 mm and a minimum tensile yield strength of 248 MPa. Subpurlins shall be shop painted.

## 2.6 FACTORY COLOR FINISH

Panels shall have a factory applied polyvinylidene fluoride finish on the exposed side. The exterior finish shall consist of a baked-on topcoat with an appropriate prime coat. Color shall match the color indicated in Section 09915 COLOR SCHEDULE. The exterior coating shall be a nominal 0.025 mm thickness consisting of a topcoat of not less than 0.018 mm dry film thickness and the paint manufacturer's recommended primer of not less than 0.005 mm thickness. The interior color finish shall consist of a backer coat with a dry film thickness of 0.013 mm. The exterior color finish shall meet the test requirements specified below.

### 2.6.1 Salt Spray Test

A sample of the sheets shall withstand a cyclic corrosion test for a minimum of 2016 hours in accordance with ASTM D 5894, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of not less than 10, no blistering, as determined by ASTM D 714; 10, no rusting, as determined by ASTM D 610; and a rating of 6, over 2.0 to 3.0 mm failure at scribe, as determined by ASTM D 1654.

#### 2.6.2 Formability Test

When subjected to testing in accordance with ASTM D 522 Method B, 3 mm diameter mandrel, the coating film shall show no evidence of cracking to the naked eye.

#### 2.6.3 Accelerated Weathering, Chalking Resistance and Color Change

A sample of the sheets shall be tested in accordance with ASTM D 4587, test condition B for 2000 total hours. The coating shall withstand the weathering test without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Protective coating that can be readily removed from the base metal with tape in accordance with ASTM D 3359, Test Method B, shall be considered as an area indicating loss of adhesion. Following the accelerated weathering test, the coating shall have a chalk rating not less than No. 8 in accordance with ASTM D 4214 test procedures, and the color change shall not exceed 5 CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244.

#### 2.6.4 Humidity Test

When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, a scored panel shall show no signs of blistering, cracking, creepage or corrosion.

#### 2.6.5 Impact Resistance

Factory-painted sheet shall withstand direct and reverse impact in accordance with ASTM D 2794 13 mm diameter hemispherical head indenter, equal to 6.7 times the metal thickness in mm, expressed in Newton-meters, with no cracking.

#### 2.6.6 Abrasion Resistance Test

When subjected to the falling sand test in accordance with ASTM D 968, Method A, the coating system shall withstand a minimum of 50 liters of sand before the appearance of the base metal. The term "appearance of base metal" refers to the metallic coating on steel or the aluminum base metal.

#### 2.6.7 Specular Gloss

Finished roof surfaces shall have a specular gloss value of 30 plus or minus 5 at 60 degrees when measured in accordance with ASTM D 523.

#### 2.6.8 Pollution Resistance

Coating shall show no visual effects when covered spot tested in a 10 percent hydrochloric acid solution for 24 hours in accordance with ASTM D 1308.

#### 2.7 INSULATION

Thermal resistance of insulation shall be not less than the R-values shown on the contract drawings. R-values shall be determined at a mean temperature of 24 degrees C in accordance with ASTM C 518. Insulation

shall be a standard product with the insulation manufacturer, factory marked or identified with insulation manufacturer's name or trademark and R-value. Identification shall be on individual pieces or individual packages. . Insulation shall have a flame spread not in excess of 75 and a smoke developed rating not in excess of 450 when tested in accordance with ASTM E 84. The stated R-value of the insulation shall be certified by an independent Registered Professional Engineer if tests are conducted in the insulation manufacturer's laboratory.

#### 2.7.1 Polyisocyanurate Rigid Board Insulation for Use Above a Roof Deck

Polyisocyanurate insulation shall conform to ASTM C 1289, Type II, (having a minimum recovered material content of 9 percent by weight of core material in the polyisocyanurate portion). For polyisocyanurate, the maximum design R-value per 25 mm of insulation used shall be 5.56 hour x sq. ft. x degree F/BTU. Facings shall be non-asphaltic, glass fiber reinforced.

#### 2.7.2 THERMAL BLOCKS

Thermal blocks shall be manufactured of extruded polystyrene and shall have an adhesive backing. Block width shall be 75mm (3 inches), or the width of the purlin upper flange, whichever is less. Block length shall be equal to the distance between panel clips. Block height shall be equal to the distance between the top of the purlins and the bottom of the roof panels.

#### 2.8 INSULATION RETAINERS

Insulation retainers shall be type, size, and design necessary to adequately hold the insulation and to provide a neat appearance. Metallic retaining members shall be nonferrous or have a nonferrous coating. Nonmetallic retaining members, including adhesives used in conjunction with mechanical retainers or at insulation seams, shall have a fire resistance classification not less than that permitted for the insulation.

#### 2.9 SEALANT

Sealants shall be elastomeric type containing no oil or asphalt. Exposed sealant shall be colored to match the applicable building color and shall cure to a rubberlike consistency. Sealant shall be factory installed in the roof panel standing seam ribs. s  
Primer shall be used on polyvinylidene fluoride finishes, when recommended by polyurethane and/or silicon sealant manufacturers to achieve maximum sealant adhesion.

#### 2.10 GASKETS AND INSULATING COMPOUNDS

Gaskets and insulating compounds shall be nonabsorptive and suitable for insulating contact points of incompatible materials. Insulating compounds shall be nonrunning after drying.

#### 2.11 ICE & WATER SHIELD UNDERLAYMENT

Uwnderlayment shall comply with ASTM D 1970, except thickness shall be a minimum of 30 mils. Underlayment shall be capable of withstanding high, in-service temperatures without melting or otherwise deteriorating; shall be capable of withstanding 60 days exposure to the sun without deteriorating; and shall have a non-granular, non-slip surface. Acceptable products are GAF StormGuard HT and Grace Vycor Ultra.

#### 2.12 EPDM RUBBER BOOTS

Flashing devices around pipe penetrations shall be flexible, one-piece devices molded from weather-resistant EPDM rubber. Rubber boot material shall be as recommended by the manufacturer. The boots shall have base rings made of aluminum or corrosion resisting steel that conform to the contours of the roof panel to form a weather-tight seal.

## 2.13 PREFABRICATED CURBS AND EQUIPMENT SUPPORTS

Prefabricated curbs and equipment supports shall be of structural quality, hot-dipped galvanized or galvanized sheet steel or aluminum. All exposed surfaces shall have the same finish system and color as the roofing panels. Integral base plates and water diverter crickets shall be provided. Minimum height of curb shall be 200 mm above finish roof. Curbs shall be constructed to match roof slope and to provide a level top surface for mounting of equipment. Curb flange shall be constructed to match configuration of roof panels. Curb size shall be coordinated, prior to curb fabrication, with the mechanical equipment to be supported. Strength requirements for equipment supports shall be coordinated to include all anticipated loads. Flashings shall not be rigidly attached to underlying structure.

## PART 3 EXECUTION

### 3.1 INSTALLATION

Installation shall be in accordance with the manufacturer's erection instructions and drawings. Dissimilar materials which are not compatible when contacting each other shall be insulated by means of gaskets or insulating compounds. Molded closure strips shall be installed wherever roofing sheets terminate in open-end configurations, exclusive of flashings. The closure strip installation shall be weather-tight and sealed. Screws shall be installed with a clutching screw gun, to assure screws are not stripped. Field test shall be conducted on each gun prior to starting installation and periodically thereafter to assure it is adjusted properly to install particular type and size of screw as recommended by manufacturer's literature. Improper or mislocated drill holes shall be plugged with an oversize screw fastener and gasketed washer; however, sheets with an excess of such holes or with such holes in critical locations shall not be used. Exposed surfaces and edges shall be kept clean and free from sealant, metal cuttings, hazardous burrs, and other foreign material. Stained, discolored, or damaged sheets shall be removed from the site.

#### 3.1.1 Field Forming of Panels for Unique Area

When roofing panels are formed from factory-color-finished steel coils at the project site, the same care and quality control measures that are taken in shop forming of roofing panels shall be observed. Rollformer shall be operated by the metal roofing manufacturer's representative. In cold weather conditions, preheating of the steel coils to be field formed shall be performed as necessary just prior to the rolling operations.

#### 3.1.2 Purlins/Subpurlins

Unless otherwise shown, purlins and/or subpurlins shall be anchored to the structural framing members with bolts or screws. Attachment to the substrate (metal decking) or to the panels is not permitted. Purlins and/or subpurlins shall be spliced and braced as shown on the manufacturer's drawings. The purlin/subpurlin spacing shall not exceed 750 mm on centers at the corner, edge and ridge zones, and 1500 mm maximum on centers for the remainder of the roof. Corner, edge, and ridge zones are as defined in ASCE 7.

### 3.1.3 Roof Panel Installation

Roof panels shall be installed with the standing seams in the direction of the roof slope. The side seam connections for installed panels shall be completed at the end of each day's work. Method of applying joint sealant shall conform to the manufacturer's recommendation to achieve a complete weather-tight installation. End laps of panels shall be provided in accordance with the manufacturer's instructions. Closures, flashings, EPDM rubber boots, roof curbs, and related accessories shall be installed according to the manufacturer's drawings. Fasteners shall not puncture roofing sheets except as provided for in the manufacturer's instructions for erection and installation. Expansion joints for the standing seam roof system shall be installed at locations indicated on the contract drawings and other locations indicated on the manufacturer's drawings.

### 3.1.4 Concealed Anchor Clips

Concealed anchor clips shall be fastened directly to the structural framing members. Attachment to the substrate (when provided) or to the metal deck is not permitted. The maximum distance, parallel to the seams, between clips shall be 750 mm on center at the corner, edge, and ridge zones, and 1500 mm maximum on centers for the remainder of the roof.

## 3.2 INSULATION INSTALLATION

Insulation shall be continuous over entire roof surface. Where expansion joints, terminations, and other connections are made, the cavity shall be filled with batt insulation with vapor retarder providing equivalent R-value and perm rating as remaining insulation. Insulation shall be installed as indicated and in accordance with manufacturer's instructions.

### 3.2.1 Board Insulation

Rigid insulation shall be laid in close contact. Board shall be attached to the metal roof deck with bearing plates and fasteners, as recommended by the insulation manufacturer, so that the insulation joints are held tight against each other, and shall have a minimum of 1 fastener per 0.37 square meters. Layout and joint pattern of insulation and fasteners shall be indicated on the shop drawings. If more than one layer of insulation is required, joints in the second layer shall be offset from joints in the first layer.

### 3.2.2 Thermal Blocks

Thermal blocks shall be installed on top of every purlin, between panel clips.

## 3.3 ICE AND WATER SHIELD UNDERLAYMENT INSTALLATION

Underlayment shall be installed over the entire surface directly under the standing seam roof panels. Underlayment shall be installed in shiplap fashion upslope. Horizontal and vertical laps shall be in accordance with the manufacturer's instructions. Underlayment shall be lapped at valleys, with ends of lapping sheets extending a minimum of 12 inches past edges of valley reinforcement plates. Underlayment shall extend over hips and ridges. Installed underlayment shall not be exposed to the elements for more than 60 days. Damaged or deteriorated underlayment shall be patched or replaced as appropriate.

## 3.4 CLEANING AND TOUCH-UP

Exposed SSSMR systems shall be cleaned at completion of installation.

Debris, such as metal drillings, that could cause discoloration and harm to the panels, flashings, closures and other accessories shall be removed. Grease and oil films, excess sealants, and handling marks shall be removed and the work shall be scrubbed clean. Peelable films shall be removed on a timely basis. Exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks. Immediately upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with the same material used for the shop coat. Factory color finished surfaces shall be touched up with the manufacturer's recommended polyvinylidene fluoride touch up paint, using a small diameter artist's brush. Application of touch up paint with broad brushes will not be acceptable.

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY  
FOR  
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM

FACILITY DESCRIPTION \_\_\_\_\_

BUILDING NUMBER: \_\_\_\_\_

CORPS OF ENGINEERS CONTRACT NUMBER: \_\_\_\_\_

CONTRACTOR

CONTRACTOR: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

POINT OF CONTACT: \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_

OWNER

OWNER: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

POINT OF CONTACT: \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_

CONSTRUCTION AGENT

CONSTRUCTION AGENT: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

POINT OF CONTACT: \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY  
FOR  
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM  
(continued)

THE SSSMR SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY \_\_\_\_\_ FOR A PERIOD OF FIVE (5) YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE. THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING: THE ENTIRE ROOFING SYSTEM, MANUFACTURER SUPPLIED FRAMING AND STRUCTURAL MEMBERS, METAL ROOF PANELS, FASTENERS, CONNECTORS, ROOF SECUREMENT COMPONENTS, AND ASSEMBLIES TESTED AND APPROVED IN ACCORDANCE WITH ASTM E 1592. IN ADDITION, THE SYSTEM PANEL FINISHES, SLIP SHEET, INSULATION, VAPOR RETARDER, ALL ACCESSORIES, COMPONENTS, AND TRIM AND ALL CONNECTIONS ARE INCLUDED. THIS INCLUDES ROOF PENETRATION ITEMS SUCH AS VENTS, CURBS, SKYLIGHTS; INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS; FASCIA COVERS, EAVES, RIDGE, HIP, VALLEY, RAKE, GABLE, WALL, OR OTHER ROOF SYSTEM FLASHINGS INSTALLED AND ANY OTHER COMPONENTS SPECIFIED WITHIN THIS CONTRACT TO PROVIDE A WEATHERTIGHT ROOF SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THE SPECIFICATIONS THAT ARE PART OF THE SSSMR SYSTEM.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE ASSOCIATED WITH THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY SHALL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS WARRANTY SHALL COVER THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON \_\_\_\_\_ AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

\_\_\_\_\_  
(Company President)

\_\_\_\_\_  
(Date)

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY  
FOR  
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM  
(continued)

THE CONTRACTOR SHALL SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND/OR INSTALLER OF THE SSSMR SYSTEM, WHICH SHALL BE SUBMITTED ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY EXAMPLE.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).
2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.
3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.
4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.
5. FAILURE OF ANY PART OF THE SSSMR SYSTEM DUE TO ACTIONS BY THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE. CONTRACTOR'S DESIGN SHALL INSURE FREE DRAINAGE FROM THE ROOF AND NOT ALLOW PONDING WATER.
6. THIS WARRANTY APPLIES TO THE SSSMR SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.
7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.

\*\*

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY  
FOR  
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM  
(continued)

\*\*REPORTS OF LEAKS AND SSSMR SYSTEM DEFICIENCIES SHALL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS SHALL BE INITIATED IMMEDIATELY; A WRITTEN PLAN SHALL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT SHALL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE SSSMR SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.

IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS AND/OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED, THE PARTIES SHALL, WITHIN TEN (10) DAYS, JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES SHALL CONFER WITHIN TEN (10) DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE (1) NAME REMAINS. THE REMAINING PERSON SHALL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED, ETC., SHALL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT SHALL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT.

A FRAMED COPY OF THIS WARRANTY SHALL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

-- End of Section --

SECTION 07720

ROOF VENTILATORS, GRAVITY-TYPE

04/00

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 653/A 653M (1999) Steel Sheet, Zinc-Coated  
(Galvanized) or Zinc-Iron Alloy-Coated  
(Galvannealed) by the Hot-Dip Process

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (1995) Minimum Design Loads for Buildings  
& Other Structures

SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION  
(SMACNA)

SMACNA Arch. Manual (1993; Errata; Addenda Oct 1997)  
Architectural Sheet Metal Manual

1.2 DESIGN REQUIREMENTS

Ventilators shall be designed for use with the specific type of project roofing system, and shall provide uniform and continuous air flow. Ventilator design shall provide protection against rain and snow, and shall be provided with a continuous weep along the bottom of both sides of wind band. Units shall be self-cleaning by the action of the elements, and shall have provisions for carrying water and normal wind-transported soil matter to the outside. Units shall be designed for windspeeds of not less than 36 meters per second in accordance with ASCE 7. Ventilators shall be free of internal obstructions or moving parts which will require maintenance, and shall be complete with type of mounting indicated on drawings.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Roof Ventilators;

Dimensioned drawings indicating location of each type of ventilator including details of construction, gauges of metal, and methods of operation of dampers and controls.

#### SD-03 Product Data

Materials;  
Ridge Ventilators;  
Stationary Ventilators;  
Turbine Ventilators;

### 1.4 QUALIFICATION

Manufacturer shall specialize in design and manufacture of the type of roof ventilators specified in this section, and shall have a minimum of 5 years of documented successful experience. Ventilator installer shall be experienced in the installation of ventilator types specified.

### 1.5 DELIVERY, STORAGE AND HANDLING

Roof ventilators shall be cartoned or crated prior to shipment. Ventilators shall be protected from moisture and damage. Damaged items shall be removed from site.

### 1.6 PROJECT/SITE CONDITIONS

Rough openings shall be field-measured and recorded on shop drawings prior to fabrication of roof ventilators. Fabrication shall be scheduled with construction schedule.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### AM 1

#### 2.1.1 Galvanized Steel Sheets

Steel sheets shall be commercial quality, zinc-coated steel (hot-dip galvanized) of quality established by ASTM A 653/A 653M, minimum G90 coating thickness.

### 2.2 RIDGE VENTILATORS

Roof ridge ventilators shall be fabricated of galvanized steel, and shall be assembled to any desired length. Continuous-run ridge ventilators shall be connected with splice plates of type which will telescope together and not require fasteners, soldering or welding. Ventilators shall be provided with UL labeled fire-actuated damper system complete with accessories to meet building code requirements. Dampers and airshafts shall be complete with urethane gasketing for extra-tight enclosures. Metal closure strips which match the panel roof rib contours shall be provided to close out weather and provide a secure seat for ventilators. Bird screens shall be provided.

#### AM 1 2.3 TURBINE VENTILATORS

Turbine ventilators shall be fabricated of galvanized steel flat sheets, complete with sensitive ball-bearing action to enable the slightest motion of air to move the rotor head where suction is maintained at low wind velocities. Ventilators shall have 360 degree operating surface to assure access of wind currents regardless of wind velocities. Rotor head shall be anchored to prevent head from lifting or jumping off the rotor in high winds. Rotor crown plate shall be seamless. Bird screens shall be provided.

### 2.3.1 Dampers

Turbine ventilators shall be provided with thermostat control electric gear motor-operated dampers

### 2.3.2 Rotor Shaft

Rotor shaft bearings shall be entirely shielded in corrosion-resistant aluminum casing. Bearings shall be pre-lubricated and shall have life-time warranty. Bearings shall be at top and bottom to assure accurate alignment. Shaft and bearings shall be easily replaceable as a unit. Rotor collar shall be rolled and welded.

## 2.4 FABRICATION

Ventilators shall be fabricated in accordance with approved shop drawings. Welds, soldered seams, rivets and fasteners shall be clean, secure, watertight, and smooth. Edges shall be wired or beaded, where necessary, to ensure rigidity. Joints between sections shall be watertight and shall allow for expansion and contraction. Galvanic action between different metals in direct contact shall be prevented by nonconductive separators.

## 2.5 CURB BASES

Ventilator bases for curb-mounted installations shall be of size indicated on drawings, and shall be designed specifically for the type of ventilator and roofing system approved for this project. Curb bases shall be factory-formed and flashed for a watertight installation. Curb bases shall be fabricated of material and finish to match the ventilator.

## 2.6 SCREENS

Screens shall be furnished by ventilator manufacturer as part of ventilator assembly. Screen (with frames) shall be manufactured of material to match ventilators, and shall be designed to be easily removed for cleaning purposes.

## 2.7 FINISH

### 2.7.1 Galvanized Steel Finish

Galvanized steel roof ventilators shall be factory-coated with rust-resistant primer and finish coats to match metal roof panels AM 1.

## PART 3 EXECUTION

### 3.1 PREPARATION

Rough openings and other roof conditions shall be prepared in accordance with approved shop drawings and manufacturer's recommendations. Before starting the ventilator work, surrounding roof surfaces shall be protected from damage.

### 3.2 INSTALLATION

Roof ventilator installation shall be coordinated with roofing work, and shall be installed in accordance with approved shop drawings, manufacturer's published instructions, and chapter 8 of SMACNA Arch. Manual.

The ventilator installation shall be watertight and shall be free of vibration noise. Aluminum surfaces shall be protected from direct contact with incompatible materials. Aluminum surfaces which will be in contact with sealant shall not be coated with a protective material. Aluminum

shall not be used with copper or with water which flows over copper surfaces. Roof ventilators shall be cleaned in accordance with ventilator manufacturer's recommendations.

### 3.3 PROTECTION

Exposed ventilator finish surfaces shall be protected against the accumulation of paint, grime, mastic, disfigurement, discoloration and damage for duration of construction activities.

-- End of Section --

SECTION 07900

JOINT SEALING

06/97

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 509	(1994) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM C 570	(1995) Oil- and Resin-Base Caulking Compound for Building Construction
ASTM C 734	(1993) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
ASTM C 834	(1995) Latex Sealants
ASTM C 920	(1998) Elastomeric Joint Sealants
ASTM C 1085	(1991) Butyl Rubber-Based Solvent-Release Sealants
ASTM C 1184	(1995el) Structural Silicone-Sealants
ASTM D 217	(1997) Cone Penetration of Lubricating Grease (IP50/88)
ASTM D 1056	(1998) Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D 1565	(1999) Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam)
ASTM E 84	(1999) Surface Burning Characteristics of Building Materials

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Backing.

Bond-Breaker.

Sealant.

Manufacturer's descriptive data including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). A copy of the Material Safety Data Sheet shall be provided for each solvent, primer or sealant material.

#### SD-07 Certificates

Sealant.

Certificates of compliance stating that the materials conform to the specified requirements.

### 1.3 ENVIRONMENTAL REQUIREMENTS

The ambient temperature shall be within the limits of 4 to 32 degrees C when the sealants are applied.

### 1.4 DELIVERY AND STORAGE

Materials shall be delivered to the job in the manufacturer's original unopened containers. The container label or accompanying data sheet shall include the following information as applicable: manufacturer, name of material, formula or specification number, lot number, color, date of manufacture, mixing instructions, shelf life, and curing time at the standard conditions for laboratory tests. Materials shall be handled and stored to prevent inclusion of foreign materials. Materials shall be stored at temperatures between 4 and 32 degrees C unless otherwise specified by the manufacturer.

## PART 2 PRODUCTS

### 2.1 BACKING

Backing shall be 25 to 33 percent oversize for closed cell and 40 to 50 percent oversize for open cell material, unless otherwise indicated.

#### 2.1.1 Rubber

Cellular rubber sponge backing shall be ASTM D 1056, Type 2, closed cell, Class A, roundcross section.

#### 2.1.2 PVC

Polyvinyl chloride (PVC) backing shall be ASTM D 1565, Grade VO 12, closed cell foam, round cross section.

#### 2.1.3 Synthetic Rubber

Synthetic rubber backing shall be ASTM C 509, Option I, Type II preformed rods.

### 2.2 BOND-BREAKER

Bond-breaker shall be as recommended by the sealant manufacturer to prevent adhesion of the sealant to backing or to bottom of the joint.

### 2.3 PRIMER

Primer shall be non-staining type as recommended by sealant manufacturer for the application.

2.4 [Enter Appropriate Subpart Title Here]

2.5 SEALANT

2.5.1 LATEX

Latex Sealant shall be ASTM C 834.

2.5.2 ELASTOMERIC AM 1

Elastomeric sealants shall conform to ASTM C 920 and the following:

- a. Polysulfide Sealant: Type S, Grade NS, Class 25, Use M.
- b. Polyurethane sealant: Grade NS, Class 25, Use M.
- c. Silicone sealant: Type S, Grade NS, Class 25, Use , M.
- d. Structural silicone sealant: ASTM C 1184, Type S, Use G.

2.5.3 ACOUSTICAL

Rubber or polymer-based acoustical sealant shall have a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E 84. Acoustical sealant shall have a consistency of 250 to 310 when tested in accordance with ASTM D 217, and shall remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C 734, and shall be non-staining.

2.6 SOLVENTS AND CLEANING AGENTS

Solvents, cleaning agents, and accessory materials shall be provided as recommended by the manufacturer.

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Surface Preparation

The surfaces of joints to receive sealant or caulk shall be free of all frost, condensation and moisture. Oil, grease, dirt, chalk, particles of mortar, dust, loose rust, loose mill scale, and other foreign substances shall be removed from surfaces of joints to be in contact with the sealant. Oil and grease shall be removed with solvent and surfaces shall be wiped dry with clean cloths. For surface types not listed below, the sealant manufacturer shall be contacted for specific recommendations.

3.1.2 Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil, or other such materials, the materials shall be removed by sandblasting or wire brushing. Laitance, efflorescence and loose mortar shall be removed from the joint cavity.

3.1.3 Steel Surfaces

Steel surfaces to be in contact with sealant shall be sandblasted or, if sandblasting would not be practical or would damage adjacent finish work, the metal shall be scraped and wire brushed to remove loose mill scale. Protective coatings on steel surfaces shall be removed by sandblasting or by a solvent that leaves no residue.

### 3.1.4 Wood Surfaces

Wood surfaces to be in contact with sealants shall be free of splinters and sawdust or other loose particles.

## 3.2 APPLICATION

### 3.2.1 Masking Tape

Masking tape may be placed on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Masking tape shall be removed within 10 minutes after joint has been filled and tooled.

### 3.2.2 Backing

Backing shall be installed to provide the indicated sealant depth. The installation tool shall be shaped to avoid puncturing the backing.

### 3.2.3 Bond-Breaker

Bond-breaker shall be applied to fully cover the bottom of the joint without contaminating the sides where sealant adhesion is required.

### 3.2.4 Primer

Primer shall be used on concrete masonry units, wood, or other porous surfaces in accordance with instructions furnished with the sealant. Primer shall be applied to the joint surfaces to be sealed. Surfaces adjacent to joints shall not be primed.

### 3.2.5 Sealant

Sealant shall be used before expiration of shelf life. Multi-component sealants shall be mixed according to manufacturer's printed instructions. Sealant in guns shall be applied with a nozzle of proper size to fit the width of joint. Joints shall be sealed as detailed in the drawings. Sealant shall be forced into joints with sufficient pressure to expel air and fill the groove solidly. Sealant shall be installed to the indicated depth without displacing the backing. Unless otherwise indicated, specified, or recommended by the manufacturer, the installed sealant shall be dry tooled to produce a uniformly smooth surface free of wrinkles and to ensure full adhesion to the sides of the joint; the use of solvents, soapy water, etc., will not be allowed. Sealants shall be installed free of air pockets, foreign embedded matter, ridges and sags. Sealer shall be applied over the sealant when and as specified by the sealant manufacturer.

## 3.3 CLEANING

The surfaces adjoining the sealed joints shall be cleaned of smears and other soiling resulting from the sealant application as work progresses.

-- End of Section --

SECTION 08110

STEEL DOORS AND FRAMES

10/00

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A250.3	(1999) Test Procedure and Acceptance Criteria for Factory Applied Finish
ANSI A250.6	(1997) Hardware on Steel Doors (Reinforcement - Application)
ANSI A250.8	(1998) Standard Steel Doors and Frames
ANSI A 250.10	(1998) Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 236	(1989; R 1993e1) Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box
ASTM C 976	(1990; R 1996e) Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box
ASTM D 2863	(1997) Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
ASTM E 90	(1999) Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

DOOR AND HARDWARE INSTITUTE (DHI)

DHI A115.1G	(1994) Installation Guide for Doors and Hardware
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NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM HMMA 862	(1987) Hollow Metal Manual; Section: Guide Specifications for Commercial Security
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## Hollow Metal Doors and Frames

NAAMM HMMA 865

(1995) Hollow Metal Manual; Section: Guide  
Specifications for Swinging Sound Control  
Hollow Metal Doors and Frames

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80

(1999) Fire Doors and Fire Windows

NFPA 80A

(1996) Protection of Buildings from  
Exterior Fire Exposures

NFPA 101

(2000) Life Safety Code

NFPA 252

(1999) Fire Tests of Door Assemblies

## STEEL DOOR INSTITUTE (SDOI)

SDOI SDI-106

(1999) Standard Door Type Nomenclature

SDOI SDI-128

(1997) Guidelines for Acoustical  
Performance of Standard Steel Doors and  
Frames

## UNDERWRITERS LABORATORIES (UL)

UL 10B

(1997) Fire Tests of Door Assemblies

UL 10C

(1998) Positive Pressure Fire Tests of  
Door Assemblies

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-02 Shop Drawings

## Doors and Frames

Drawings using standard door type nomenclature in accordance with SDOI SDI-106 indicating the location of each door and frame, elevation of each model of door and frame, details of construction, method of assembling sections, location and extent of hardware reinforcement, hardware locations, type and location of anchors for frames, and thicknesses of metal. Drawings shall include catalog cuts or descriptive data for the doors, frames, and weatherstripping including air infiltration data and manufacturers printed instructions.

## SD-03 Product Data

## Fire Rated Doors

A letter by a nationally recognized testing laboratory which identifies the product manufacturer, type, and model; certifying that the laboratory has tested a sample assembly in accordance with NFPA 252 and issued a current listing for same.

## SD-04 Samples

## Doors and Frames

Manufacturer's standard color samples of factory applied finishes with third party certification of compliance to ANSI A250.10.

## SD-07 Certificates

Fire Rated Doors  
Thermal Insulated Doors;

a. Certification of Oversized Fire Doors: Certificates of compliance in accordance with the requirements of UL 10B for fire doors exceeding the sizes for which label service is available.

b. Certification of Thermal Insulating Rating: Certification or test report for security rating, sound rated or thermal insulated doors shall show compliance with the specified requirements. The certification, or test report, shall list the parameters and the type of hardware and perimeter seals used to achieve the rating.

## 1.3 DELIVERY AND STORAGE

During shipment, welded unit type frames shall be strapped together in pairs with heads at opposite ends or shall be provided with temporary steel spreaders at the bottom of each frame; and knockdown type frames shall be securely strapped in bundles. Materials shall be delivered to the site in undamaged condition, and stored out of contact with the ground and under a weathertight covering permitting air circulation. Doors and assembled frames shall be stored in an upright position in accordance with DHI A115.1G. Abraded, scarred, or rusty areas shall be cleaned and touched up with matching finishes.

## 1.4 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

## PART 2 PRODUCTS

## 2.1 DOORS AND FRAMES

Doors and frames shall be factory fabricated in accordance with ANSI A250.8 and the additional requirements specified herein. Door Level shall be heavy duty (Level 2) unless otherwise indicated on the door and door frame schedules. Exterior doors and frames shall be designation A60 galvanized.

Interior frames shall be designation A40 galvanized. Doors and frames shall be prepared to receive hardware conforming to the templates and information provided under Section 08700 BUILDERS' HARDWARE. Doors and frames shall be reinforced, drilled, and tapped to receive mortised hinges, locks, latches, and flush bolts as required. Doors and frames shall be reinforced for surface applied hardware. Frames shall be welded type. Door frames shall be furnished with a minimum of three jamb anchors and one floor anchor per jamb. Anchors shall be not less than 4.5 mm (7 gauge) steel or diameter wire. For wall conditions that do not allow the use of a floor anchor, an additional jamb anchor shall be provided. **AM 1 All metal doors shall have a 3mm +/- 0.5mm clearance from jamb all around door at final installation.** Rubber silencers shall be furnished for installation into factory predrilled holes in door frames; adhesively applied silencers

are not acceptable. Where frames are installed in plaster or masonry walls, plaster guards shall be provided on door frames at hinges and strikes. Full glass doors shall conform to ANSI A250.8 and shall include provisions for glazing. Reinforcing of door assemblies for closers and other required hardware shall be in accordance with ANSI A250.8 and the conditions of the fire door assembly listing when applicable. Exterior doors shall have top edges closed flush and sealed against water penetration.

## 2.2 FIRE RATED DOORS

Fire rated door assemblies shall bear the listing identification label of a nationally recognized testing laboratory qualified to perform tests of fire door assemblies in accordance with UL 10B and NFPA 252 and having a listing for the tested assemblies. The fire resistance rating shall be as shown. Doors exceeding the sizes for which listing label service is offered shall be in accordance with UL 10B. Listing identification labels shall be constructed and permanently applied by a method which results in their destruction should they be removed.

## 2.3 THERMAL INSULATED DOORS

The thermal insulated doors shall have a minimum insulation value of R10. The interior of thermal insulated doors shall be filled with rigid plastic foam permanently bonded to each face panel. The thermal conductance (U-value) through the door shall not exceed  $2.33 \text{ W/sq m times K}$  ( $0.41 \text{ btu/hr times sq f times f}$ ) when tested as an operational assembly in accordance with ASTM C 236 or ASTM C 976. Doors with cellular plastic cores shall have a minimum oxygen index rating of 22 percent when tested in accordance with ASTM D 2863.

## 2.4 WEATHERSTRIPPING

Unless otherwise specified in Section 08700 BUILDERS' HARDWARE, weatherstripping shall be as follows: Weatherstripping for head and jamb shall be manufacturer's standard elastomeric type of synthetic rubber, vinyl, or neoprene and shall be installed at the factory or on the jobsite in accordance with the door frame manufacturer's recommendations. Weatherstripping for bottom of doors shall be as shown. Air leakage rate of weatherstripping shall not exceed  $0.31 \text{ l/s per linear meter}$  ( $0.20 \text{ cfm per linear foot}$ ) of crack when tested in accordance with ASTM E 283 at standard test conditions.

## 2.5 TRANSOM AND SIDELIGHT PANELS

Panels for transom and sidelight shall be constructed in accordance with ANSI A250.8. Panels shall be nonremovable from the outside of exterior doors or the unsecure side of interior doors.

## 2.6 LOUVERS

Where indicated, doors shall be provided with louver sections. Louvers shall be sightproof type inserted into the door. Pierced louvers shall not be used on exterior doors. Inserted louvers shall be stationary. Louvers shall be nonremovable from the outside of exterior doors or the unsecure side of interior doors. Insect screens shall be a removable type with 18 by 16 mesh aluminum or bronze cloth.

## 2.7 GLAZING

Glazing shall be as specified in Section 08810 GLASS AND GLAZING. Removable glazing beads shall be screw-on or snap-on type.

## 2.8 FACTORY FINISH

Doors and frames shall be phosphatized and primed with standard factory primer system. Color shall be in accordance with Section 09915 COLOR SCHEDULE.

## PART 3 EXECUTION

### 3.1 GENERAL REQUIREMENTS

Installation shall not begin until temperature and humidity conditions closely approximate interior conditions which will exist when area is complete and occupied; heating and air conditioning shall be operating prior to, during, and after installation. Contractor shall coordinate the work with that of other trades and shall verify opening dimensions with contract and shop drawings. Each frame shall be installed plumb and square using door as template; the frame shall be secured to the wall in accordance with the manufacturer's instructions. All damaged or defective frames shall be repaired/replaced prior to final inspection.

### 3.2 INSTALLATION

Installation shall be in accordance with DHI A115.1G. Preparation for surface applied hardware shall be in accordance with ANSI A250.6. Rubber silencers shall be installed in door frames after finish painting has been completed; adhesively applied silencers are not acceptable. Weatherstripping shall be installed at exterior door openings to provide a weathertight installation. Installation and operational characteristics of fire doors shall be in accordance with NFPA 80, NFPA 80A and NFPA 101. Hollow metal door frames shall be solid grouted in masonry walls AM 1.

#### 3.2.1 Thermal Insulated Doors

Hardware and perimeter seals shall be adjusted for proper operation. Doors shall be sealed weathertight after installation of hardware and shall be in accordance with Section 07900 JOINT SEALING.

### 3.3 FIELD PAINTED FINISH

Steel doors and frames shall be field painted in accordance with Section 09900 PAINTING, GENERAL. Weatherstrips shall be protected from paint. Finish shall be free of scratches or other blemishes. Color shall be in accordance with Section 09915 COLOR SCHEDULE.

### 3.4 SPECIAL INSPECTION REQUIREMENTS

Continuous and/or periodic Special Inspection shall be performed for the connection types and connections indicated on the drawings.

-- End of Section --

SECTION 08120

ALUMINUM DOORS AND FRAMES  
**07/98**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45 (1997) Designation System for Aluminum Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 605 (1998) Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels

AAMA 1503 (1998) Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 209 (1996) Aluminum and Aluminum-Alloy Sheet and Plate

ASTM B 209M (1995) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)

ASTM B 221 (1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

ASTM B 221M (1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)

ASTM E 283 (1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ASTM E 330 (1997e1) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

ASTM E 331 (1996) Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

1.2 SYSTEM DESCRIPTION

Frames and swing-type aluminum doors, of size and design shown on the

drawings, shall be provided at the locations indicated. Frames shall be furnished complete with doors, subframes, transoms, adjoining sidelights, trim, and other accessories indicated and specified.

### 1.3 PERFORMANCE REQUIREMENTS

#### 1.3.1 Wind Load Performance

Doors and frames shall be of sufficient strength to withstand a design wind load of 1440 Pa (30 pounds per square foot) of supported area with a deflection of not more than 1/175 times the length of the member. Doors shall be tested in accordance with ASTM E 330 at a pressure not less than 1.5 times the design load.

#### 1.3.2 Water Penetration Performance

Frames and fixed areas, and non-handicap complying doors shall have no water penetration when tested in accordance with ASTM E 331 at a pressure of 383 Pa.

### 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-03 Product Data

##### Aluminum Doors and Frames

Manufacturer's descriptive data and catalog cuts including air-infiltration data.

##### Installation Cleaning

Manufacturer's installation instructions and cleaning instructions.

#### SD-04 Samples

##### Finishes

Samples of the color anodized coating, showing the extreme color range.

#### SD-06 Test Reports

##### Aluminum Doors

For full-glazed and doors, certified test reports from an independent testing laboratory, stating that doors are identical in design, materials, and construction to a door that has been tested and meets all test and specified requirements.

### 1.5 DELIVERY AND STORAGE

Materials delivered to the jobsite shall be inspected for damage, and shall be unloaded with a minimum of handling. Storage shall be in a dry location with adequate ventilation, free from dust, water, and other contaminants, and which permits easy access for inspecting and handling. Materials shall

be neatly stored on the floor, properly stacked on nonabsorptive strips or wood platforms. Doors and frames shall not be covered with tarps, polyethylene film, or similar coverings.

## 1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one-year period shall be provided.

## PART 2 PRODUCTS

### 2.1 ALUMINUM DOORS AND FRAMES

Extrusions shall comply with ASTM B 221M, Alloy 6063-T5 or -T6, except alloy used for anodized color coatings shall be required to produce the specified color. Aluminum sheets and strips shall comply with ASTM B 209M, alloy and temper best suited for the purpose. Fasteners shall be hard aluminum or stainless steel.

#### 2.1.1 Finishes

Finish shall be color anodized. Color anodized finish shall be **AM 1 Dark Bronze, to match windows**, AA-M10C22A44 in accordance with the requirements of AA DAF-45.

#### 2.1.2 Welding and Fastening

Where possible, welds shall be located on unexposed surfaces. Welds required on exposed surfaces shall be smoothly dressed. Welding shall produce a uniform texture and color in the finished work, free of flux and spatter. Exposed screws or bolts will be permitted only at inconspicuous locations and shall have heads countersunk.

#### 2.1.3 Anchors

**AM 1** Anchors shall be stainless steel or steel with a hot-dipped galvanized finish. Anchors of the sizes and shapes required shall be provided for securing aluminum frames to adjacent construction. Anchors shall be placed near top and bottom of each jamb and at intermediate points not more than 625 mm. Transom bars shall be anchored at ends, and mullions shall be anchored at head and sill. Where indicated on the drawings, vertical mullion reinforcement shall be of sufficient length to extend up to the overhead structural framing and be securely attached thereto. The bottom of each frame shall be anchored to the rough floor construction with 2.4 mm (3/32 inch) thick stainless steel angle clips secured to the back of each jamb and to floor construction. Stainless steel bolts and expansion rivets shall be used for fastening clip anchors. Door frames shall be reinforced and securely anchored to floor construction.

#### 2.1.4 Hardware

Hardware for aluminum doors is specified in Section 08700 BUILDERS' HARDWARE. Doors and frames shall be cut, reinforced, drilled, and tapped at the factory to receive template hardware. Reinforcement shall be provided in the core of doors as required to receive locks, door closers, and other hardware. Doors to receive surface applied hardware shall be reinforced as required.

#### 2.1.5 Glazing

Glazing shall be as specified in Section 08810 GLASS AND GLAZING. Metal glazing beads, vinyl inserts, and glazing gaskets shall be provided for securing glass. Glass stops shall be tamperproof on exterior side.

### 2.1.6 Weatherstripping

Weatherstripping shall be continuous silicone-treated wool pile type, or a type recommended by the door manufacturer and shall be provided on head and jamb of exterior door frames. Weatherstripping for bottom of doors shall be as shown. Weatherstripping shall be easily replaced without special tools, and shall be adjustable at meeting stiles of pairs of doors. Air leakage rate of weatherstripping shall not exceed 0.775 L/s per lineal meter (0.5 cfm per lineal foot) of crack when tested in accordance with ASTM E 283 at standard test conditions.

### 2.2 ALUMINUM FRAMES

Frames shall be AM 1 double-glazed window wall system and shall have a minimum total average unit thermal resistance of 0.34 square meter degree K per W (R value 1.92). Frames shall be fabricated of extruded aluminum shapes to contours as shown on the drawings. Shapes shown are representations of design, function, and required profile. Dimensions shown are minimum. Shapes of equivalent design may be submitted, subject to approval of samples. Minimum metal wall thickness shall be 2.29 mm, except glazing beads, moldings, and trim shall be not less than 1.27 mm. Frames that are to receive glass shall have removable snap-on glass stops and glazing beads. Joints in frame members shall be milled to a hairline tight fit so that raw edges of the assembly are not visible, sealed internally to prevent water infiltration, reinforced, and secured mechanically by appropriate screws or by screw spline attachment.

### 2.3 ALUMINUM DOORS

Doors shall be not less than 44.4 mm (1-3/4 inches) thick. Clearances at hinge stiles, lock stiles and top rails, floors and thresholds, shall comply with manufacturer's standard. Single-acting doors shall be beveled 3 mm at lock and meeting stile edges. Double-acting doors shall have rounded edges at hinge stile, lock stile, and meeting stile edges.

#### 2.3.1 Full-Glazed Stile and Rail Doors

Doors shall have narrowstiles and rails as shown, and shall be fabricated from extruded aluminum hollow seamless tubes or from a combination of open-shaped members interlocked or welded together. Doors shall be double-glazed and shall have a minimum total average unit thermal resistance of 0.34 square meter degree K per W (R value 1.92). Top and bottom rail shall be fastened together by means of welding or by 10 mm diameter plated tensioned steel tie rods. An adjustable mechanism shall be provided in the top rail of narrow stile doors to allow for minor clearance adjustments after installation. Extruded aluminum snap-in glazing beads shall be provided on interior side of doors. Extruded aluminum theft-proof snap-in glazing beads or fixed glazing beads shall be provided on exterior or security side of doors. Glazing beads shall have vinyl insert glazing gaskets, designed to receive glass of thickness required. Glass is specified in Section 08810 GLASS AND GLAZING.

### 2.4 COLOR, TEXTURE, AND PATTERN

AM 1 Color of glass shall match remaining glazing in admin building.  
Doors and frames and sidelights and transoms shall be Dark Bronze anodized.

## PART 3 EXECUTION

### 3.1 INSTALLATION OF DOORS, FRAMES, AND ACCESSORIES

#### 3.1.1 Protection of Aluminum

Aluminum shall not be used where it will be in contact with copper or where it will contact water which flows over copper surfaces. Aluminum that will be in contact with wet or pressure-treated wood, mortar, concrete, masonry, or ferrous metals shall be protected against galvanic or corrosive action by one of the following methods.

#### 3.1.1.1 Paint

Aluminum surfaces to be protected shall be solvent cleaned and given a coat of zinc-molybdate primer and one coat of aluminum paint.

#### 3.1.1.2 Nonabsorptive Tape or Gasket

Nonabsorptive tape or gasket shall be placed between the adjoining surfaces and shall be cemented to the aluminum surface using a cement compatible with aluminum.

#### 3.1.2 Installation

Frames and framing members shall be accurately set in position to receive adjoining components. Frames shall be plumb, square, level, and in alignment, and securely anchored to adjacent construction. Metal-to-metal joints between framing members and joints between framing members and building surfaces shall be sealed as specified in Section 07900 JOINT SEALING. Doors shall be accurately hung with proper clearances, and adjusted to operate properly.

#### 3.1.3 Cleaning

Doors and frames shall be cleaned in accordance with the manufacturer's approved instructions.

-- End of Section --

SECTION 08210

WOOD DOORS

08/00

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA 135.4 (1995) Basic Hardboard

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 283 (1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI Qual Stds (1999) Architectural Woodwork Quality Standards

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3 (1995) High-Pressure Decorative Laminates

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80 (1999) Fire Doors and Fire Windows

NFPA 101 (2000) Life Safety Code

NFPA 252 (1999) Fire Tests of Door Assemblies

NATIONAL WOOD WINDOW & DOOR ASSOCIATION (NWWDA)

NWWDA I.S. 1-A (1997) Architectural Wood Flush Doors

NWWDA I.S. 4 (1994) Water-Repellent Preservative Non-Pressure Treatment for Millwork

NWWDA I.S. 6 (1991) Wood Stile and Rail Doors

1.2 GENERAL REQUIREMENTS

1.2.1 Standard Products

Doors shall be of the type, size, and design indicated on the drawings, and shall be the standard products of manufacturers regularly engaged in the manufacture of wood doors.

1.2.2 Marking

Each door shall bear a stamp, brand, or other identifying mark indicating quality and construction of the door. The identifying mark or a separate certification shall include identification of the standard on which construction of the door is based, identity of the manufacturing plant, identification of the standard under which preservative treatment, if used, was made, and identification of the doors having a Type I glue bond.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-02 Shop Drawings

Wood Doors and Frames.

Drawings indicating the location of each door, elevation of each type of door, details of construction, marks to be used to identify the doors, and location and extent of hardware blocking. Drawings shall include catalog cuts or descriptive data for doors, weatherstripping, flashing, and thresholds to be used.

Fire Doors.

Manufacturers preprinted installation and touch-up instructions.

#### SD-04 Samples

Factory Coated Natural Finish.

Samples of factory applied natural finish.

#### SD-07 Certificates

Fire Rated Doors.  
Adhesives.

Certificates for oversize fire doors and/or door/frame assemblies stating that the doors are identical in design, materials, and construction to a door that has been tested and meets the requirements for the class indicated. Certificate stating that adhesives used for proposed doors do not contain any formaldehyde.

### 1.4 STORAGE

Doors shall be stored in fully covered areas and protected from damage and from extremes in temperature and humidity. Doors shall be stored on supports to prevent warping or twisting, and to provide ventilation. Factory cartons or wrappers shall be kept intact until installation.

### 1.5 HARDWARE

Hardware, including weatherstripping and thresholds, is specified in Section 08700 BUILDERS' HARDWARE.

### 1.6 GLAZING

Glazing is specified in Section 08810 GLASS AND GLAZING.

## 1.7 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

## PART 2 PRODUCTS

### 2.1 GENERAL FABRICATION REQUIREMENTS

#### 2.1.1 Edge Sealing

Wood end-grain exposed at edges of doors shall be sealed prior to shipment.

#### AM 1 2.1.2 Adhesives

Adhesives shall be in accordance with NWWDA I.S. 1-A, requirements for Type I Bond Doors (waterproof) for exterior doors and requirements for Type II Bond Doors (water-repellent) for interior doors. Adhesive for doors to receive a transparent finish shall be nonstaining. Adhesives shall contain no formaldehydes.

#### 2.1.3 Prefitting

Doors shall be furnished prefitted AM 1.

### AM 1 2.2 FLUSH DOORS

Flush doors shall be solid core and shall conform to NWWDA I.S. 1-A, except for the one year acclimatization requirement in paragraph T-2, which shall not apply. Wood doors shall be 7-ply construction with faces, stiles, and rails bonded to the cores.

#### 2.2.1 Core Construction

##### 2.2.1.1 Solid Cores

Door construction shall be AM 1 particle board core with vertical and horizontal edges bonded to the core. Blocking and hardware reinforcements for particle board doors shall be blocking option HB-6 in accordance with NWWDA I.S. 1-A.

#### 2.2.2 Face Panels

##### 2.2.2.1 Natural Finished Wood Veneer Doors

Veneer doors to receive natural finish shall be Premium Grade, book matched birch veneer in accordance with NWWDA I.S. 1-A. Vertical stile strips shall be selected to provide edges of the same species and/or color as the face veneer. Door finish shall be in accordance with paragraph FINISHING.

### 2.3 Natural Finished Doors

Doors to receive natural finish shall be Premium Grade Birch in accordance with AWI Qual Stds. Finish shall be in accordance with paragraph FINISHING AM 1

### 2.4 FIRE RATED DOORS

AM 1 Fire rated door assemblies shall bear the listing identification label of a nationally recognized testing laboratory qualified to perform tests of fire door assemblies in accordance with NFPA 252 and having a listing for

the tested assemblies. The specific time interval rating on the labels shall be as shown in the door schedules. Door assemblies shall be in accordance with NFPA 80. Listing identification on labels shall be constructed and permanently applied by a method which results in their destruction should they be removed. Fire rated doors shall be mineral core 45 minute rating.

#### 2.4.1 Reinforcement Blocking

Fire rated doors shall be provided, as required, with hardware reinforcement blocking, and top, bottom, and intermediate rail blocking. Lock blocks shall be manufacturer's standard. Reinforcement blocking shall be in compliance with the manufacturer's labeling requirements. Reinforcement blocking shall not be of mineral material.

#### 2.4.2 Stile Edges

Composite fire rated doors shall be provided with vertical stile edges that do not contain fire retardant salts. Vertical stiles shall be of the same species and/or color as the face veneer.

#### 2.5 MOULDING AND EDGING

Moulding and edging shall be as shown. Wood species for transparent finished doors shall be compatible with veneer.

#### 2.6 FINISHING

##### 2.6.1 Factory Coated Natural Finish

Doors indicated to receive factory coated natural finish shall be given a transparent finish conforming to AWI Qual Stds, Section 1500, Premiumgrade, light stain, medium rubbedsheen, close grain effect. Finish shall be AWI factory finish system Number TR3 or TR4. Color of the natural finish shall be in accordance with Section 09915 COLOR SCHEDULE. AM 1

### PART 3 EXECUTION

#### 3.1 INSTALLATION OF DOORS

##### 3.1.1 General Use Doors

Doors shall be fit, hung, and trimmed as required. Door shall have a clearance of 3 mm at the sides and top and shall have a bottom clearance of 6 mm over thresholds and 13 mm at other locations unless otherwise shown. The lock edge or both edges of doors shall be beveled at the rate of 3 mm in 50 mm. AM 1 Bottom of doors shall be undercut to allow clear door swing over carpeted areas. AM 1

##### 3.1.2 Fire Doors

Installation, hardware, and operational characteristics shall conform to NFPA 80 and NFPA 101 and shall be in strict conformance with the manufacturer's printed instructions. Properly sized pilot holes shall be drilled for screws in door edges. Factory applied labels shall remain intact where installed. Labeled hinge stile edge and top edge of door shall not be trimmed. Lock stile edge and bottom edge may be trimmed only to the extent recommended by the door manufacturer.

AM 1 AM 1

-- End of Section --

SECTION 08330

OVERHEAD ROLLING DOORS

06/97

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 653/A 653M	(1999a) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip process
ASTM E 84	(1999) Surface Burning Characteristics of Building Materials
ASTM E 330	(1997e1) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING  
ENGINEERS (ASHRAE)

ASHRAE HDBK-IP	(1997) Handbook, Fundamentals I-P Edition
ASHRAE HDBK-SI	(1997) Handbook, Fundamentals SI Edition

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 2	(1993) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated Not More Than 2,000 Volts AC or 750 Volts DC
NEMA ICS 6	(1993) Industrial Control and Systems Enclosures
NEMA MG 1	(1998) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1999) National Electrical Code
NFPA 80	(1999) Fire Doors and Fire Windows

1.2 DESCRIPTION

Overhead rolling doors shall be spring counterbalanced, rolling type, with interlocking slats, complete with guides, fastenings, hood, brackets, and operating mechanisms, and shall be designed for use on openings as indicated. Fire doors shall bear the Underwriters Laboratories, Warnock Hersey, Factory Mutual or other nationally recognized testing laboratory

label for the rating listed on the drawings. Each door shall be provided with a permanent label showing the manufacturer's name and address and the model/serial number of the door. Doors in excess of the labelled size shall be deemed oversize and shall be provided with a listing agency oversize label, or a listing agency oversize certificate, or a certificate signed by an official of the manufacturing company certifying that the door and operator have been designed to meet the specified requirements.

#### 1.2.1 Wind Load Requirements

Doors and components shall be designed to withstand the minimum design wind load of 960 Pa. Doors shall be constructed to sustain a superimposed load, both inward and outward, equal to 1-1/2 times the minimum design wind load.

Test data showing compliance with design windload requirements for the specific door design tested in accordance with the uniform static air pressure difference test procedures of ASTM E 330 shall be provided. Recovery shall be at least 3/4 of the maximum deflection within 24 hours after the test load is removed. Sound engineering principles may be used to interpolate or extrapolate test results to door sizes not specifically tested.

#### 1.2.2 Operational Cycle Life

All portions of the door and door operating mechanism that are subject to movement, wear, or stress fatigue shall be designed to operate through a minimum number of 50,000 cycles. One complete cycle of door operation is defined as when the door is in the closed position, moves to the full open position, and returns to the closed position.

#### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

##### SD-02 Shop Drawings

Overhead Rolling Door Unit.

Drawings showing the location of each door including schedules. Drawings shall include elevations of each door type, details and method of anchorage, details of construction, location and installation of hardware, shape and thickness of materials, details of joints and connections, and details of guides, power operators, controls, and other fittings.

##### SD-03 Product Data

Overhead Rolling Door Unit.

Manufacturer's catalog data, test data, and summary of forces and loads on the walls/jambs.

Overhead Rolling Door Unit.

Manufacturer's preprinted installation instructions.

#### AM 1

##### SD-04 Samples

Overhead Rolling Door Unit.

Manufacturer's standard color samples of factory applied finishes.

#### SD-07 Certificates

Fire Doors.

Oversize labels or certificates stating that the overhead rolling doors conform to requirements of this section. Certificates for oversize fire doors stating that the doors and hardware are manufactured in compliance with the requirements for doors of this type and class and have been tested and meet the requirements for the class indicated. Certificate is not required when fire door has a listing agency label or oversize label on the door bottom bar.

#### SD-10 Operation and Maintenance Data

Operation Manual.

Maintenance and Repair Manual.

Six copies of the system operation manual and system maintenance and repair manual for each type of door and control system.

### 1.4 DELIVERY AND STORAGE

Doors shall be delivered to the jobsite wrapped in a protective covering with the brands and names clearly marked thereon. Doors shall be stored in a dry location that is adequately ventilated and free from dirt and dust, water, and other contaminants, and in a manner that permits easy access for inspection and handling.

### 1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1-year period shall be provided.

### 1.6 OPERATION AND MAINTENANCE MANUALS

Operating instructions outlining the step-by-step procedures required for motorized door and shutter operation for the overhead rolling door unit shall be provided. The instructions shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features. Maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, troubleshooting guides, and simplified diagrams for the equipment as installed shall be provided. A complete list of parts and supplies, source of supply, and a list of the high mortality maintenance parts shall be provided.

## PART 2 PRODUCTS

### 2.1 OVERHEAD ROLLING DOORS

Doors shall be surface-mounted type with guides at jambs set back a sufficient distance to clear the opening. Exterior doors shall be mounted on interior side of walls.

#### 2.1.1 Curtains

The curtains shall roll up on a barrel supported at the head of opening on

brackets, and shall be balanced by helical torsion springs. Steel slats for doors less than 4.6 m wide shall be minimum bare metal thickness of 0.71 mm. Steel slats for doors from 4.6 to 6.4 m wide shall be minimum bare metal thickness of 0.87 mm. Steel slats for doors 6.4 m wide and wider shall be minimum bare metal thickness of 1.1 mm. **AM 1 Rough openings of the roll-up doors in the Engine Repair Shop are 5100mm and 3100mm, respectively.**

#### 2.1.1.1 Insulated Curtains

The slat system shall supply a minimum R-value of 4 when calculated in accordance with ASHRAE HDBK-IP ASHRAE HDBK-SI. Slats shall be of the flat type as standard with the manufacturer. Slats shall consist of a polystyrene core not less than 17 mm thick, completely enclosed within metal facings. Exterior face of slats shall be gauge as specified for curtains. Interior face shall be not lighter than 0.56 mm. The insulated slat assembly shall have a flame spread rating of not more than 25 and a smoke development factor of not more than 50 when tested in accordance with ASTM E 84.

#### 2.1.2 Endlocks and Windlocks

The ends of each alternate slat for interior doors shall have steel endlocks of manufacturer's stock design. In addition to endlocks, non-rated exterior doors shall have the manufacturer's standard windlocks as required to withstand the wind load. Windlocks shall prevent the curtain from leaving guides because of deflection from specified wind pressure.

#### 2.1.3 Bottom Bar

The curtain shall have a standard bottom bar consisting of two hot-dip galvanized steel angles for steel doors. A sensing edge shall be attached to the bottom bar of doors that are electric-power operated.

#### 2.1.4 Guides

Guides shall be steel structural shapes or formed steel shapes, of a size and depth to provide proper clearance for operation and resistance under the design windload. Guides shall be attached to adjoining construction with fasteners recommended by the manufacturer. Spacing of fasteners shall be as required to meet the minimum design windload. Doors and guides in hazardous areas shall have static grounding.

#### 2.1.5 Barrel

The barrel shall be steel pipe or commercial welded steel tubing of proper diameter for the size of curtain. Deflection shall not exceed 2.5 mm per meter of span. Ends of the barrel shall be closed with metal plugs, machined to fit the pipe. Aluminum plugs are acceptable on non-fire door barrels.

#### 2.1.6 Springs

Oil tempered helical steel counter-balance torsion springs shall be installed within the barrel and shall be capable of producing sufficient torque to assure easy operation of the door curtain. Access shall be provided for spring tension adjustment from outside of the bracket without removing the hood.

#### 2.1.7 Brackets

Brackets shall be of steel plates to close the ends of the roller-shaft housing, and to provide mounting surfaces for the hood. An operation

bracket hub and shaft plugs shall have sealed prelubricated ball bearings.

#### 2.1.8 Hoods

Hoods shall be steel AM 1 with minimum bare metal thickness of 0.56 mm formed to fit contour of the end brackets, and shall be reinforced with steel rods, rolled beads, or flanges at top and bottom edges. Multiple segment and single piece hoods shall be provided with support brackets of the manufacturer's standard design as required for adequate support.

#### 2.1.9 Weatherstripping

Exterior doors shall be fully weatherstripped. A compressible and replaceable weather seal shall be attached to the bottom bar. Weather seal at door guides shall be continuous vinyl or neoprene, bulb or leaf type, or shall be nylon-brush type. A weather baffle shall be provided at the lintel or inside the hood. Weatherstripping shall be easily replaced without special tools.

#### 2.1.10 Operation

Doors shall be operated by means of electric power with auxiliary chain hoist. Equipment shall be designed and manufactured for usage in AM 1 non-hazardous Class .

##### 2.1.10.1 Electric Power Operator With Auxiliary Chain Hoist Operation

AM 1 Electric power operators shall be heavy-duty industrial type. The unit shall operate the door through the operational cycle life specified. The electric power operator shall be complete with electric motor, auxiliary operation, self-locking worm gear in oil bath for heavy-duty doors, brake, mounting brackets, push button controls, limit switches, magnetic reversing starter, and all other accessories necessary to operate components specified in other paragraphs of this section. The operator shall be so designed that the motor may be removed without disturbing the limit-switches settings and without affecting the emergency chain operator.

Doors shall be provided with an auxiliary operator for immediate emergency manual operation of the door in case of electrical failure. Auxiliary operation shall be by means of galvanized endless chain extending to within 915 mm of the floor. The emergency manual operating mechanism shall be so arranged that it may be operated from the floor without affecting the settings of the limit switches. A mechanical device shall be included that will disconnect the motor from the drive operating mechanism when the auxiliary operator is used. Where control voltages differ from motor voltage, a control voltage transformer shall be provided in and as part of the electric power operator system. Control voltage shall not exceed 120 volts.

a. Motors: Drive motors shall conform to NEMA MG 1, shall be high-starting torque, reversible type, and shall be of sufficient wattage and torque output to move the door in either direction from any position at a speed range of 0.18 m per second (6 to 8 inches per second) without exceeding the rated capacity. Motors shall be suitable for operation on AM 1 208 volts, 60 hertz, 3- phase current and shall be suitable for across-the-line starting. Motors shall be designed to operate at full capacity over a supply voltage variation of plus or minus 10 percent of the motor voltage rating. Motors shall be provided with overload protection.

b. Controls: Control equipment shall conform to NEMA ICS 2. Enclosures shall conform to NEMA ICS 6, Type 12 (industrial use), AM 1 in accordance with NFPA 70. Exterior control stations shall be weatherproof AM 1, tamperproof key-operated type with corrosion-resistant cast-metal cover. Provide foru key for each exterior door control station. Each control station shall be of the three position buttontype, marked "OPEN,"

"CLOSE," and "STOP." The "OPEN" and "STOP" controls shall be of the momentary contact type with seal-in contact. The "CLOSE" control shall be of the momentary contact type. When the door is in motion and the "STOP" control is pressed, the door shall stop instantly and remain in the stop position; from the stop position, the door shall be operable in either direction by the "OPEN" or "CLOSE" controls. Controls shall be of the full-guarded type to prevent accidental operation. Readily adjustable limit switches shall be provided to automatically stop the doors at their fully open and closed positions.

c. Sensing Edge Device: The bottom edge of electric power operated doors shall have a pneumatic sensing edge for AM 1 non-hazardous areas that will reverse the door movement upon contact with an obstruction and cause the door to return to its full open position. The sensing edge shall not substitute for a limit switch. Exterior doors shall be provided with a combination compressible weather seal and sensing edge.

d. Electrical Work: Conduit and wiring necessary for proper operation shall be provided under Section 16415 ELECTRICAL WORK, INTERIOR. Flexible connections between doors and fixed supports shall be made with flexible type SJO cable, except in hazardous locations where wiring shall conform to NFPA 70, as appropriate. The cable shall have a spring-loaded automatic take up reel or a coil cord equivalent device.

#### 2.1.11 Inertia Brake

Overhead rolling door shall have a mechanical inertia brake device which will stop the door from free fall in any position, should there be a failure in the motor operator brake or roller chain drive. The unit shall be capable of being reset with a back drive action.

#### 2.1.12 Locking

Locking for motor operated doors shall consist of self-locking gearing and optional master keyed cylinder with electrical interlock, with chain lock for emergency hand chain.

#### 2.1.13 Finish

Steel slats and hoods shall be hot-dip galvanized G60 in accordance with ASTM A 653/A 653M, and shall be treated for paint adhesion and shall receive a factory baked-on finish coat. The paint system shall withstand a minimum of 1500 hours without blistering, bubbling, or rust. Surfaces other than slats, hood, and faying surfaces shall be cleaned and treated to assure maximum paint adherence and shall be given a factory dip or spray coat of rust inhibitive metallic oxide or synthetic resin primer. Color shall be in accordance with Section 09915 COLOR SCHEDULE.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

Doors shall be installed in accordance with approved detail drawings and manufacturer's instructions. Anchors and inserts for guides, brackets, motors, switches, hardware, and other accessories shall be accurately located. Upon completion, doors shall be free from warp, twist, or distortion. Doors shall be lubricated, properly adjusted, and demonstrated to operate freely.

AM 1 -- End of Section --

SECTION 08510

STEEL WINDOWS

09/98

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123/A 123M	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 569/A 569M	(1998) Commercial Steel (CS) Sheet and Strip, Carbon (0.15 Maximum Percent), Hot-Rolled
ASTM A 653/A 653M	(1999) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924/A 924M	(1999) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 633	(1985; R 1998) Electrodeposited Coatings of Zinc on Iron and Steel
ASTM B 766	(1998) Electrodeposited Coatings of Cadmium
ASTM D 3656	(1997) Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns
ASTM E 283	(1991) Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E 330	(1997e) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
ASTM E 331	(1996) Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(1995) Minimum Design Loads For Buildings and Other Structures
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ASME INTERNATIONAL (ASME)

ASME A39.1	(1995; A39.1a, A39.1b) Safety Requirements
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## for Window Cleaning

ASME B18.6.3 (1972; R 1997) Machine Screws and Machine Screw Nuts

ASME B18.6.4 (1981; R 1997) Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws (Inch Series)

## INSECT SCREENING WEAVERS ASSOCIATION (ISWA)

ISWA IWS 089 (1990) Recommended Standards and Specifications for Insect Wire Screening (Wire Fabric)

## NATIONAL FENESTRATION RATING COUNCIL (NFRC)

NFRC 100 (1997) Procedure for Determining Fenestration Product U-factors

NFRC 200 (1997) Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80 (1999) Fire Doors and Fire Windows

NFPA 101 (1997; Errata 97-1; TIA-97-1) Life Safety Code

## SCREEN MANUFACTURERS ASSOCIATION (SMA)

SMA ANSI/SMA 1004 (1987) Aluminum Tubular Frame Screens for Windows

## STEEL WINDOW INSTITUTE (SWI)

SWI Specifier's Guide (1995) The Specifier's Guide to Steel Windows

## 1.2 WINDOW PERFORMANCE

Steel windows shall be designed to meet the following performance requirements, and shall be of the type and size indicated.

## 1.2.1 Structural Performance

Windows shall be designed to withstand windloads determined by procedures in ASCE 7 and a wind speed of **AM 1 90 mph**. Structural test pressures on window units shall be for positive load (inward) and negative load (outward) equal to 1-1/2 times the minimum design windload when tested in accordance with ASTM E 330. After testing, there shall be no glass breakage, permanent damage to main frame, sash or ventilator member, fasteners, hardware parts, support arms or actuating mechanisms or any other damage which could cause window to be inoperable. There shall be no permanent deformation in excess of the requirements established by SWI Specifier's Guide for the window types specified in this section.

## 1.2.2 Air Infiltration

Air infiltration shall not exceed the amount established by SWI Specifier's Guide for weatherstripped window types when tested in accordance with ASTM

E 283.

#### 1.2.3 Water Penetration

Water penetration shall not exceed the amount established by SWI Specifier's Guide for weatherstripped window types when tested in accordance with ASTM E 331.

#### 1.2.4 Thermal Performance

Thermal transmittance for steel windows with insulating glass shall not exceed a U-factor of  $4.3 \text{ W/m}^2\text{K}$  ( $0.75 \text{ Btu/hr-ft}^2\text{-F}$ ) determined according to NFRC 100, and a solar heat gain coefficient (SHGC) of  $2.3 \text{ W/m}^2\text{K}$  ( $0.40 \text{ Btu/hr-ft}^2\text{-F}$ ) determined according to NFRC 200. Window units shall comply with the U.S. Department of Energy, Energy Star Window Program for the Southern Climate Zone. Window units shall comply with the U.S. Department of Energy, Energy Star Window Program for the Northern Climate Zone.

#### 1.2.5 Condensation Index Rating

The condensation index rating shall be 85 as determined using National Fenestration Rating Council approved software THERM.

#### 1.2.6 Life Safety Criteria

Windows shall conform to NFPA 101 when rescue and/or second means of escape are indicated.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-02 Shop Drawings

##### Steel Windows;

Drawings indicating elevations of windows, rough-opening dimensions for each type and size of windows, full-size sections, thicknesses of metal, fastenings, methods of installation and anchorage, connections with other work, type of wall construction, size and spacing of anchors, method of glazing, types and locations of operating hardware, mullion details, weatherstripping details, screen details including method of attachment, and window schedules showing locations of each window type and indicating compliance with fire safety code, where required.

#### SD-03 Product Data

##### Steel Windows

Manufacturer's descriptive data and catalog cut sheets.

##### Steel Windows

Manufacturer's preprinted installation instructions and cleaning instructions.

Fire-rated Windows;  
Weatherstripping;  
Insect Screens;  
Accessories;  
Finishes;

#### SD-04 Samples

Steel Windows

Manufacturer's standard color samples of painted finishes.

#### SD-07 Certificates

Steel Windows

Certificates stating that the steel windows conform to requirements of this section. Product ratings determined using NFRC 100 and NFRC 200 shall be authorized for certification and properly labeled by the manufacturer.

### AM 1

#### 1.4 QUALIFICATION

Window manufacturer shall specialize in designing and manufacturing the type of steel windows specified, and shall have a minimum of 5 years of documented successful experience. Manufacturer shall have the facilities capable of meeting contract requirements, single-source responsibility and warranty.

### AM 1 1.5 DELIVERY AND STORAGE

Steel windows shall be delivered to project site and stored in accordance with manufacturer's recommendations. Damaged windows shall be replaced with new windows.

#### 1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Steel Bars

Steel bars shall be solid one-piece sections hot-rolled from new billet steel in accordance with SWI Specifier's Guide.

#### 2.1.2 Sheet Steel

Hot-rolled sheet steel shall conform to ASTM A 569/A 569M, commercial quality with a minimum of 0.15 percent carbon. Cold-rolled sheet steel shall conform to ASTM A 653/A 653M. Sheet steel shall be zinc coated (galvanized) by the hot-dip process in accordance with ASTM A 653/A 653M or ASTM A 924/A 924M.

#### 2.1.3 Screws and Bolts

Screws and bolts shall conform to ASTM B 766, ASME B18.6.3 and ASME B18.6.4.

## 2.2 STEEL WINDOW TYPES

Steel windows shall be designed for outside field glazing, and for glass types scheduled on drawings and specified in Section 08810 GLASS AND GLAZING. Units shall be complete with glass and glazing provisions to meet requirements of paragraph WINDOW PERFORMANCE and SWI Specifier's Guide. Glazing material shall be compatible with steel, and shall not require painting.

### 2.2.1 Fixed Windows

Fixed windows shall be made of hot rolled or cold rolled profiles. If cold rolled profiles are used, steel shall be minimum 20 gauge thickness. Glazing beads shall be of the snap on or screw on type.

## 2.3 WEATHERSTRIPPING

Weatherstripping for steel window ventilating sections shall be manufacturer's standard designed to meet water penetration and air infiltration requirements specified under paragraph WINDOW PERFORMANCE in accordance with SWI Specifier's Guide, and shall be manufactured of material compatible with steel and shall be resistant to weather. Weatherstrips shall be factory-applied and shall be easily replaced in the field. Neoprene or polyvinylchloride weatherstripping are not acceptable where exposed to direct sunlight.

## AM 1 2.4 FINISHES

### 2.4.1 Prime Coat

Steel windows, fins, mullions, cover plates and associated parts shall be cleaned, treated and factory primed with manufacturer's standard primer coat in a dry film thickness of not less than 0.025 mm. Primer coat shall be free of scratches and other blemishes.

#### AM 1

### 2.4.2 Baked Enamel

Finish Steel windows shall be coated with a baked-on silicon polyester enamel in a dry film thickness of not less than 0.025 mm. Finish shall be free of scratches and other blemishes. Color shall AM 1 match HM door frames in Section 09915 COLOR SCHEDULE.

#### AM 1

## PART 3 EXECUTION

### 3.1 INSTALLATION

Steel windows shall be installed in accordance with approved shop drawings and manufacturer's approved recommendations. Fire-rated windows shall be installed in compliance with NFPA 80 and NFPA 101. Steel surfaces in close proximity with masonry, concrete, wood, and dissimilar metals other than stainless steel, zinc, cadmium, or small areas of white bronze shall be protected from direct contact. The completed window installation shall be watertight and shall be in accordance with Section 07900 JOINT SEALING. Glazing shall be installed in accordance with requirements of this section and Section 08810 GLASS AND GLAZING. Fire-rated windows shall be glazed in accordance with NFPA 80.

### 3.2 ADJUSTMENTS AND CLEANING

#### AM 1 3.2.1 Cleaning

Steel window finish and glass shall be cleaned on interior and exterior sides in accordance with window manufacturer's recommendations. Alkaline or abrasive agents shall not be used.

3.3 [Enter Appropriate Subpart Title Here]

AM 1

-- End of Section --

SECTION 08520

ALUMINUM AND ENVIRONMENTAL CONTROL ALUMINUM WINDOWS

03/00

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45 (1997) Designation System for Aluminum Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 101 (1997) Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors

AAMA 603 (1998) Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum

AAMA 605 (1998) voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

AM 1

AAMA 1503

(1998) Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3656 (1997) Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns

ASTM E 283 (1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ASTM E 330 (1997e1) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

ASTM E 331 (1996) Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

ASTM E 413 (1987; R 1999) Rating Sound Insulation

ASTM E 547 (1996) Water Penetration of Exterior  
Windows, Curtain Walls, and Doors by  
Cyclic Static Air Pressure Differential

INSECT SCREENING WEAVERS ASSOCIATION (ISWA)

ISWA IWS 089 (1990) Recommended Standards and  
Specifications for Insect Wire Screening  
(Wire Fabric)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101 (1997; Errata 97-1; TIA-97-1) Life Safety  
Code

SCREEN MANUFACTURERS ASSOCIATION (SMA)

SMA ANSI/SMA 1004 (1987) Aluminum Tubular Frame Screens for  
Windows

1.2 WINDOW PERFORMANCE

Aluminum windows shall meet the following performance requirements.  
Testing requirements shall be performed by an independent testing  
laboratory or agency.

1.2.1 Structural Performance

Structural test pressures on window units shall be for positive load  
(inward) and negative load (outward) in accordance with ASTM E 330. After  
testing, there shall be no glass breakage, permanent damage to fasteners,  
hardware parts, support arms or actuating mechanisms or any other damage  
which could cause window to be inoperable. There shall be no permanent  
deformation of any main frame, sash or ventilator member in excess of the  
requirements established by AAMA 101 for the window types and  
classification specified in this section.

1.2.2 Air Infiltration

Air infiltration shall not exceed the amount established by AAMA 101 for  
each window type when tested in accordance with ASTM E 283.

1.2.3 Water Penetration

Water penetration shall not exceed the amount established by AAMA 101 for  
each window type when tested in accordance with ASTM E 547 AM 1.

1.2.4 Thermal Performance

Thermal transmittance for thermally broken aluminum windows with insulating  
glass shall not exceed a U-factor of  $4.3 \text{ W/m}^2\text{K}$  ( $0.75 \text{ Btu/hr-ft}^2\text{-F}$ )  
determined according to NFRC 100 AM 1 or AAMA 1503.

1.2.5 Condensation AM 1 Resistance Factor

Windows shall have a minimum condensation resistance factor of 48 when  
tested in accordance with AAMA 1503.

#### 1.2.6 Life Safety Criteria

Windows shall conform to NFPA 101 Life Safety Code when rescue and/or second means of escape are indicated.

#### AM 1 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

##### SD-02 Shop Drawings

Aluminum Windows  
Insect Screens

Drawings indicating elevations of window, rough-opening dimensions for each type and size of window, full-size sections, thicknesses of metal, fastenings, methods of installation and anchorage, connections with other work, type of wall construction, size and spacing of anchors, method of glazing, types and locations of operating hardware, mullion details, weatherstripping details, screen details including method of attachment, and window schedules showing locations of each window type.

##### SD-03 Product Data

Aluminum Windows

Manufacturer's descriptive data and catalog cut sheets.

Aluminum Windows

Manufacturer's preprinted installation instructions and cleaning instructions.

##### SD-04 Samples

Aluminum Windows

Manufacturer's standard color samples of the specified finishes.

##### SD-06 Test Reports

Aluminum Windows

Reports for each type of aluminum window attesting that identical windows have been tested and meet all performance requirements established under paragraph WINDOW PERFORMANCE.

##### SD-07 Certificates

Aluminum Windows

Certificates stating that the aluminum windows conform to requirements of this section. Labels or markings permanently affixed to the window will be accepted in lieu of certificates.

#### AM 1

#### 1.4 QUALIFICATION

Window manufacturer shall specialize in designing and manufacturing the type of aluminum windows specified in this section, and shall have a minimum of 5 years of documented successful experience. Manufacturer shall have the facilities capable of meeting contract requirements, single-source responsibility and warranty.

**AM 1 1.5 DELIVERY AND STORAGE**

Aluminum windows shall be delivered to project site and stored in accordance with manufacturer's recommendations. Damaged windows shall be replaced with new windows.

**1.6 WARRANTY**

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

**PART 2 PRODUCTS**

**2.1 ALUMINUM WINDOW TYPES**

Aluminum windows shall consist of complete units including sash, glass, frame, weatherstripping, and hardware. Windows shall conform to AAMA 101. Windows shall be thermal break type double-glazed. Thermal barrier shall be neoprene, rigid vinyl, or polyurethane and shall be resistant to weather. Window members shall be heli-arc welded or angle-reinforced and mechanically joined and sealed. Exposed welded joints shall be dressed and finished. Joints shall be permanent and weathertight. Frames shall be constructed to provide a minimum 6 mm thermal break between the exterior and interior frame surfaces. Sash corners shall be internally sealed to prevent air and water leaks.

**AM 1 2.1.1 Single-Hung Windows**

Aluminum single-hung (H) windows shall conform to AAMA 101 H-C35 type which operate vertically with the weight of sash offset by a counterbalancing mechanism mounted in window to hold the sash stationary at any open position. Windows shall be provided with a tilt-in sash. Windows shall be provided with locking devices to secure the sash in the closed position. Counterbalancing mechanisms shall be easily replaced after installation.

**2.1.2 Horizontal-Sliding Windows**

Aluminum horizontal (HS) sliding windows shall conform to AAMA 101 type consisting of sliding sash and fixed lite. Sash guides shall be nylon wheels. Windows shall be provided with locking devices to secure the sash in the closed position.

**2.2 WEATHERSTRIPPING**

Weatherstripping for ventilating sections shall be of type designed to meet water penetration and air infiltration requirements specified in this section in accordance with AAMA 101, and shall be manufactured of material compatible with aluminum and resistant to weather. Weatherstrips shall be factory-applied and easily replaced in the field. Neoprene or polyvinylchloride weatherstripping are not acceptable where exposed to direct sunlight.

**2.3 INSECT SCREENS**

Insect screens shall be aluminum window manufacturer's standard design, and shall be provided where scheduled on drawings. Insect screens shall be

fabricated of roll-formed tubular-shaped aluminum frames conforming to SMA ANSI/SMA 1004 and (18 x 16) aluminum mesh screening conforming with ISWA IWS 089, Type III. **AM 1 Full screens shall be provided on all exterior operable windows, and shall have an additional interior clip latch to hold the screen in the standard manufactured screen holding channel or rail.**

## 2.4 ACCESSORIES

### 2.4.1 Fasteners

Fastening devices shall be window manufacturer's standard design made from aluminum, non-magnetic stainless steel, cadmium-plated steel, nickel/chrome-plated steel in compliance with AAMA 101. Self-tapping sheet metal screws will not be acceptable for material thicker than 2 mm.

### 2.4.2 Hardware

Hardware shall be as specified for each window type and shall be fabricated of aluminum, stainless steel, cadmium-plated steel, zinc-plated steel or nickel/chrome-plated steel in accordance with requirements established by AAMA 101.

### 2.4.3 Window Anchors

Anchoring devices for installing windows shall be made of aluminum, cadmium-plated steel, stainless steel, or zinc-plated steel conforming to AAMA 101.

## **AM 1** 2.5 GLASS AND GLAZING

Aluminum windows shall be designed for inside glazing, field glazing, and for glass types scheduled on drawings and specified in Section 08810 GLASS AND GLAZING. Units shall be complete with glass and glazing provisions to meet AAMA 101. Glazing material shall be compatible with aluminum, and shall not require painting.

## 2.6 FINISH

### 2.6.1 Anodized Aluminum Finishes

Exposed surfaces of aluminum windows shall be finished with anodic coating conforming to AA DAF-45: **AM 1** Architectural Class I, AA-M10-C22-A44, color anodic coating, 0.02 mm (0.7 mil) or thicker. Finish shall be free of scratches and other blemishes. **Color shall be dark bronze.**

## PART 3 EXECUTION

### 3.1 INSTALLATION

Aluminum windows shall be installed in accordance with approved shop drawings and manufacturer's published instructions. Aluminum surfaces in contact with masonry, concrete, wood and dissimilar metals other than stainless steel, zinc, cadmium or small areas of white bronze, shall be protected from direct contact using protective materials recommended by AAMA 101. The completed window installation shall be watertight in accordance with Section 07900 JOINT SEALING. Glass and glazing shall be installed in accordance with requirements of this section and Section 08810 GLASS AND GLAZING.

### 3.2 ADJUSTMENTS AND CLEANING

#### 3.2.1 Hardware Adjustments

Final operating adjustments shall be made after glazing work is complete. Operating sash or ventilators shall operate smoothly and shall be weathertight when in locked position.

### 3.2.2 Cleaning

Aluminum window finish and glass shall be cleaned on exterior and interior sides in accordance with window manufacturer's recommendations. Alkaline or abrasive agents shall not be used. Precautions shall be taken to avoid scratching or marring window finish and glass surfaces.

-- End of Section --

SECTION 08700

BUILDERS' HARDWARE  
03/96  
AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
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BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA L & R Directory	(Effective thru Jun 1999) Directory of Certified Locks & Latches
BHMA Closer Directory	(Effective thru Jul (1999) Directory of Certified Door Closers
BHMA Exit Devices Directory	(Effective thru Aug 1998) Directory of Certified Exit Devices
BHMA A156.1	(1997) Butts and Hinges
BHMA A156.3	(1994) Exit Devices
BHMA A156.4	(1992) Door Controls - Closers
BHMA A156.5	(1992) Auxiliary Locks & Associated Products
BHMA A156.6	(1994) Architectural Door Trim
BHMA A156.7	(1997) Template Hinge Dimensions
BHMA A156.8	(1994) Door Controls - Overhead Stops and Holders
BHMA A156.13	(1994) Mortise Locks & Latches
BHMA A156.16	(1989) Auxiliary Hardware
BHMA A156.18	(1993) Materials and Finishes

BHMA A156.21 (1996) Thresholds

DOOR AND HARDWARE INSTITUTE (DHI)

DHI Keying Systems (1989) Keying Systems and Nomenclature

DHI Locations for CSD (1997) Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames

DHI Locations for SSD (1990) Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames

DHI ANSI/DHI A115.1G (1994) Installation Guide for Doors and Hardware

DHI ANSI/DHI A115-W (Varies) Wood Door Hardware Standards (Incl A115-W1 thru A115-W9)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80 (1999) Fire Doors and Fire Windows

NFPA 101 (1997; Errata 97-1; TIA-97-1) Life Safety Code

NFPA 105 (1999) Installation of Smoke-Control Door Assemblies

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Drawings; G

Detail drawings for hardware devices for computerized keying systems, magnetic cards, keyless push button access control systems, and other electrical hardware devices showing complete wiring and schematic diagrams and other details required to demonstrate proper function of units.

Detail drawings for hardware devices for computerized keying systems, magnetic cards, keyless push button access control systems, and other electrical hardware devices showing complete wiring and schematic diagrams and other details required to demonstrate proper function of units.

SD-03 Product Data

#### Hardware and Accessories; G

Manufacturer's descriptive data, technical literature, catalog cuts, and installation instructions. Spare parts data for locksets, exit devices, closers, electric locks, electric strikes, electro-magnetic closer holder release devices, and electric exit devices, after approval of the detail drawings, and not later than 3 month(s) prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

#### Hardware Schedule; G

Hardware schedule listing all items to be furnished. The schedule shall include for each item: the quantities; manufacturer's name and catalog numbers; the ANSI number specified, sizes; detail information or catalog cuts; finishes; door and frame size and materials; location and hardware set identification cross-references to drawings; corresponding reference standard type number or function number from manufacturer's catalog if not covered by ANSI or BHMA; and list of abbreviations and template numbers.

#### Keying; G

Keying schedule developed in accordance with DHI Keying Systems, after the keying meeting with the user.

#### SD-07 Certificates

#### Hardware and Accessories; G

The hardware manufacturer's certificates of compliance stating that the supplied material or hardware item meets specified requirements. Each certificate shall be signed by an official authorized to certify in behalf of the product manufacturer and shall identify quantity and date or dates of shipment or delivery to which the certificates apply. A statement that the proposed hardware items appear in BHMA L & R Directory, BHMA Closer Directory and BHMA Exit Devices Directory directories of certified products may be submitted in lieu of certificates.

### 1.3 PREDELIVERY CONFERENCE

Upon approval of the Hardware Schedule, the construction Contractor shall arrange a conference with the hardware supplier, Contracting Officer and the using agency to determine keying system requirements. Location of the key control storage system, set-up and key identification labeling will also be determined.

### 1.4 DELIVERY, STORAGE, AND HANDLING

Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, and shall be properly marked or labeled to be readily identifiable with the approved hardware schedule. Each change key shall be tagged or otherwise identified with the door for which its cylinder is intended. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule. Manufacturer's printed installation instructions, fasteners, and special tools shall be included in each package.

## 1.5 SPECIAL TOOLS

Special tools, such as those supplied by the manufacturer, unique wrenches, and dogging keys, shall be provided as required to adjust hardware items.

## 1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

## 1.7 OPERATION AND MAINTENANCE MANUALS

Six complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides shall be provided. The instructions for electric locks, electric strikes, electro-magnetic closer holder release devices, and electric exit devices shall include simplified diagrams as installed.

# PART 2 PRODUCTS

## 2.1 GENERAL HARDWARE REQUIREMENTS

Hardware shall conform to the requirements specified herein and the HARDWARE SETS listing at the end of this section. Hardware set numbers correspond to the set numbers shown on the drawings.

## 2.2 TEMPLATES

Requirements for hardware to be mounted on metal doors or metal frames shall be coordinated between hardware manufacturer and door or frame manufacturer by use of templates and other information to establish location, reinforcement required, size of holes, and similar details. Templates of hinges shall conform to BHMA A156.7.

## 2.3 HINGES

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7. Except as otherwise specified, hinge sizes shall conform to the hinge manufacturer's printed recommendations.

### 2.3.1 Hinges for Reverse Bevel Doors with Locks

Hinges for reverse bevel doors with locks shall have pins that are made nonremovable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position.

### 2.3.2 Contractor's Option

Hinges with antifriction bearings may be furnished in lieu of ball bearing hinges, except where prohibited for fire doors by the requirements of NFPA 80.

### 2.3.3 Pivot Hinges

Pivot hinges shall conform to BHMA A156.4.

## 2.4 LOCKS AND LATCHES

To the maximum extent possible, locksets, latchsets and deadlocks, and all components thereof, including cylinders and removable cores, shall be the products of a single manufacturer. Lock fronts for double-acting doors shall be rounded. Strikes for wood frames and pairs of wood doors shall be

furnished with wrought boxes.

#### 2.4.1 Bored Lock and Latchsets

Bored lock, latchsets, and strikes shall be series 4000 and shall conform to BHMA A156.2, Grade 1. Bored type locks and latches for doors 35 mm thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door.

#### 2.4.2 Lock Cylinders ( Rim and Bored)

Lock cylinders and cores shall comply with BHMA A156.5. Locksets shall be furnished with out removable cores. Cores shall have not less than seven pins. An extension of the existing keying system shall be provided. Cylinders and cores for locksets other than those for mechanical rooms and crawl spaces shall be manufactured by Best or Arrow to extend the existing keying system. Locksets for mechanical rooms and crawl spaces only shall be keyed to the existing Post utilities master keying system, consisting of Arrow cylinders, 1 1/4 inches, AR-1 keyway, without key removable cores. All locksets, exit devices, and padlocks shall accept same interchangeable cores.

#### 2.4.3 Lock Trim

Lock trim shall be cast, forged, or heavy wrought construction of commercial plain design. In addition to meeting the test requirement of or BHMA A156.13, lever handles, and escutcheons shall be 1.27 mm thick, if unreinforced. If reinforced, the outer shell shall be 0.89 mm thick and the combined thickness shall be 1.78 mm except that knob shanks shall be 1.52 mm thick. Lever handles shall be of plain design with ends returned to no more than 10 mm from the door face.

### 2.5 EXIT DEVICES AND EXIT DEVICE ACCESSORIES

Exit devices and exit device accessories shall conform to BHMA A156.3, Grade 1.

#### 2.5.1 Exit Devices and Auxiliary Items

Trim shall be of wrought construction and commercial plain design with straight, beveled, or smoothly rounded sides, corners, and edges. Adjustable strikes shall be provided for rim type and vertical rod devices. Open back strikes shall be provided for pairs of doors with mortise and vertical rod devices; except open back strikes shall be used on labeled doors only where specifically provided for in the published listings. Touch bars shall be provided in lieu of conventional crossbars and arms. Escutcheons shall be provided not less than 175 by 55 mm. Escutcheons shall be cut to suit cylinders and operating trim.

#### 2.5.2 Door Coordinator

Door coordinator with carry bar shall be Type 21 and shall be provided for each pair of doors equipped with an overlapping astragal. The coordinator may be mechanically operated and shall be capable of holding the active door of a pair open until the inactive door has preceded it in the closing cycle. When used as fire exit hardware, the coordinator and carry bar shall be listed or labeled by a nationally recognized independent testing laboratory.

### 2.6 KEYING

Locks shall be keyed in sets or subsets in accordance with the approved

schedule. Provide construction locksets and keys for exterior doors until beneficial occupancy date at which time permanent locks shall be installed.

Change keys for locks shall be stamped with change number and the inscription "U.S. Property Do Not Duplicate". Keys shall be supplied as follows:

Locks:	4 change keys each lock.
Construction keys:	5 total.
Blank keys:	100 total.

The keys shall be furnished to the Contracting Officer arranged in a container suitable for key control system storage in sets or subsets as scheduled."

## 2.7 DOOR CLOSING DEVICES

Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified. The opening resistance of closing devices shall not exceed 67 N applied at the latch stile or exceed 22 N where low opening resistance is scheduled.

### 2.7.1 Surface Type Closers

Surface type closers shall be Grade 1, Series C02000 Full Cover with options PT-4H, Size 1 or 2 through Size 6, and PT-4D with back check position valve. Except as otherwise specified, sizes shall conform to the manufacturer's published recommendations. Closers for outswinging exterior doors shall have parallel arms or shall be top jamb mounted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90-degree open position. **AM 1 Provide door closers with a set pin: type that cannot be unsnapped without a tool. Provide sex bolt through bolts for all closers.**

## 2.8 DOOR CONTROLS - OVERHEAD HOLDERS

Door controls - overhead holders shall conform to BHMA A156.8.

## 2.9 ARCHITECTURAL DOOR TRIM

Architectural door trim shall conform to BHMA A156.6.

### 2.9.1 Door Protection Plates

#### 2.9.1.1 Kick Plates

Kick plates shall be Type J102 stainless steel. Width of plates shall be 50 mm less than door width for single doors and 25 mm less for pairs of doors. Height shall be 400 mm, except where the bottom rail is less than 400 mm the plate shall extend to within 13 mm of the panel mold or glass bead. Edges of metal plates shall be beveled.

#### 2.9.1.2 Mop Plates

Mop plates shall be Type J103 stainless steel. Width of plates shall be 50 mm less than door width for single doors and 25 mm less for pairs of doors. The height shall be 100 mm. Edges of metal plates shall be beveled.

### 2.9.2 Push Plates

#### 2.9.2.1 Flat Plates

Flat plates shall be Type J301 1.27 mm thick stainless steel, size 100mm x 400mm. Edges of metal plates shall be beveled.

### 2.9.3 Door Pulls and Push/Pull Units

#### 2.9.3.1 Door Pulls

Door pulls shall be Category J400 stainless steel of plain modern design. Pulls for hollow metal, mineral core wood or kalamein doors shall be Type J405 thru-bolted to Type J301 flat push plates.

### 2.9.4 Push and Pull Bars

Push and pull bars shall be Category J500, aluminum. Edges of mounting plates shall be beveled.

## 2.10 AUXILIARY HARDWARE

Auxiliary hardware, consisting of door holders, door stops, and , shall conform to BHMA A156.16. Lever extension flush bolts shall be Type L14081. Dust-proof strikes shall be Type L04011 for doors that are not fire rated. Dust-proof strikes shall be Type L04021 for fire rated doors. AM 1

## 2.11 MISCELLANEOUS

### 2.11.1 Metal Thresholds

Thresholds shall conform to BHMA A156.21. Thresholds for exterior doors shall be extruded aluminum AM 1 of the type indicated and shall provide proper clearance and an effective seal with specified weather stripping. Latching thresholds shall be of such height that the bottom of the door shall be 3 mm over the tread of the threshold and 3 mm below the top of the stop. Where required, thresholds shall be modified to receive projecting bolts of flush bolts exit devices. Thresholds for doors accessible to the handicapped shall be beveled with slopes not exceeding 1:2 and with heights not exceeding 13 mm. Air leakage rate of weatherstripping shall not exceed 0.775 liters per second per lineal meter of crack when tested in accordance with ASTM E 283 at standard test conditions.

### 2.11.2 Rain Drips

Extruded aluminum, not less than 1.78 mm thick, clear anodized. Door sill rain drips shall be 38 mm to 44 mm high by 16 mm projection. Overhead rain drips shall be approximately 38 mm high by 63 mm projection and shall extend 50 mm on either side of the door opening width.

### 2.11.3 Aluminum Housed Type Weatherseals

Weatherseals of the type indicated shall consist of extruded aluminum retainers not less than 1.78 mm wall thickness with vinyl, neoprene, silicone rubber, polyurethane or vinyl brush inserts. Aluminum shall be AM 1 clear (natural) anodized. Weatherseal material shall be of an industrial/commercial grade. Seals shall remain functional through all weather and temperature conditions. Air leakage rate of weatherstripping shall not exceed 0.775 liters per second per lineal meter of crack when tested in accordance with ASTM E 283 at standard test conditions.

### 2.11.4 Key Control Storage System

Key control storage system shall conform to BHMA A156.5, Type E8331, capacity 50, and shall be properly labeled for key identification. Set up,

identification labeling and location of the key control storage shall be as directed at the Predelivery Conference.

#### 2.11.5 Door Stops

Wall stops, floor stops and combination stop and holders shall conform to BHMA A156.16. Floor mounted door stop risers shall be used on all door stops that are not of sufficient height to stop the door. Walls shall be internally reinforced for the installation of wall stops. Wall stops shall be attached to wall with metal screws and/or bolts as necessary for proper installation and operation of stop.

#### 2.12 FASTENINGS

Fastenings of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete or masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel. Sex bolts, through bolts, or machine screws and grommet nuts, where used on reverse-bevel exterior doors equipped with half-surface or full-surface hinges, shall employ one-way screws or other approved tamperproof screws. Screws for the jamb leaf of half-mortise and full-surface hinges attached to structural steel frames shall be one-way or other approved tamperproof type.

#### 2.13 FINISHES

Unless otherwise specified, finishes shall conform to AM 1 BHMA/ANSI 626, as identified in BHMA A156.18. Where painting of primed surfaces is required, painting is specified in Section 09900 PAINTING, GENERAL.

#### 2.14 HARDWARE FOR FIRE DOORS

Hardware for fire doors shall conform to the requirements of NFPA 80 and NFPA 101.

### PART 3 EXECUTION

#### 3.1 APPLICATION

Hardware shall be located in accordance with DHI Locations for CSD and DHI Locations for SSD, except that deadlocks shall be mounted 1220 mm above finish floor. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI ANSI/DHI A115.1G or DHI ANSI/DHI A115-W. Door control devices AM 1 such as closers and holders, shall be attached to doors with thru bolts and nuts or sex bolts. Alternate fastening methods may be approved by the Contracting Officer when manufacturers' documentation is submitted to verify that the fastening devices and door reinforcements are adequate to resist wind induced stresses. Electric hardware items and access control devices shall be installed in accordance with manufacturer's printed installation procedures.

##### 3.1.1 Hardware for Fire Doors and Smoke-Control Door Assemblies

Hardware for fire doors shall be installed in accordance with the requirements of NFPA 80. Exit devices installed on fire doors shall have a visible label bearing the marking "Fire Exit Hardware". Other hardware installed on fire doors, such as locksets, closers, and hinges shall have a visible label or stamp indicating that the hardware items have been approved by an approved testing agency for installation on fire-rated doors. Hardware for smoke-control door assemblies shall be installed in accordance with NFPA 105.

### 3.1.2 Door-Closing Devices

Door-closing devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

### 3.1.3 Key Control Storage Systems

Key control storage system shall be installed where directed AM 1 by the Contracting Officer.

### 3.1.4 Kick Plates and Mop Plates

Kick plates shall be installed on the push side of single-acting doors and on both sides of double-acting doors. Mop plates shall be installed on the pull side of the single acting doors.

### 3.1.5 Auxiliary Hardware

Lever extension flush bolts shall be installed at the top and bottom of the inactive leaf of pairs of doors. The bottom bolt shall operate into a dust-proof floor strike or threshold.

### 3.1.6 Thresholds

Thresholds shall be secured with a minimum of three fasteners per single door width and six fasteners per double door width with a maximum spacing of 300 mm. Exterior thresholds shall be installed in a bed of sealant with expansion anchors and stainless steel screws, except that bronze or anodized bronze thresholds shall be installed with expansion anchors with brass screws. Minimum screw size shall be No. 10 length, dependent on job conditions, with a minimum of 19 mm thread engagement into the floor or anchoring device used.

### 3.1.7 Rain Drips

Door sill rain drips shall align with the bottom edge of the door. Overhead rain drips shall align with bottom edge of door frame rabbet. Drips shall be set in sealant and fastened with stainless steel screws.

### 3.1.8 Weatherseals

Weatherseals shall be located as indicated, snug to door face and fastened in place with color matched metal screws after door and frames have been finish painted. Screw spacing shall be as recommended by manufacturer.

## AM 1 3.2 FIELD QUALITY CONTROL

Supplier shall inspect the completed installation and certify that the hardware has been furnished and installed in accordance with the manufacturers' instructions and as specified. The inspection report shall identify any malfunctioning items and recommend adjustment or replacement as appropriate.

## 3.3 HARDWARE SETS

### **Admin. Facility**

AHW-1 Door no. A101, A102

3 ea. Hinges, A2111 x 626  
1 ea. Exit device, type 1, function 08 - Grade 1 x 626  
1 ea. Closer, C72021 x 689  
1 ea. Kickplate, J102 x 630  
1 ea. Stop, L11371 x 626 with stud and expansion shield  
1 set Weatherstripping, at head, Jambs x 628  
1 ea. Threshold, J36130 x 628

AHW-2 Door no. A103, A104

2 sets Pivots, C07121, by manufacturer x finish to match door  
2 ea. Exit device, type 2, function 08 - Grade 1, by door manufacturer x finish to match door  
2 ea. Pull bars by door manufacturer x finish to match door  
2 ea. Closers, C72041 by door manufacturer x finish to match door  
2 ea. Stops, L11371 x 626 with stud and expansion shield  
1 set Weatherstripping, at head, Jambs and meeting stiles x 628  
1 ea. Threshold, J36130 x 628

AHW-3 Door no. A105, A106 (fire Rated)

3 ea. Hinges, A5111 x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Closer, C72021 x 689  
1 ea. Kickplate, J102 x 630  
1 ea. Stop, L11371 x 626 with stud and expansion shield  
1 set Rain drip head, and door bottom x 628  
1 ea. Threshold, J36130 x 626  
1 set Weatherstripping, at head, and Jambs x 628

AHW-4 Door A107

6 ea. Hinges, A5111 x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 set Self Latching Extension Flush Bolt set (Type 27) x 626  
1 ea. Dustproof strike, L04011 x 626  
2 ea. Overhead stop, C12541 x 626  
1 ea. Coordinator, Type 21A x 626  
1 ea. Astragal, overlapping steel x 626  
2 ea. Door Sweeps, R3Y415 x 626  
1 set Weatherstripping, at head, and Jambs x 628  
1 ea. Threshold, J32100 x 628

AHW-5 Door A108, A109

3 ea. Hinges, A2111 x 626  
1 ea. Lockset, F82 - Grade 1 x 626  
1 ea. Closer, C72021 x 689  
1 ea. Kickplate, J102 x 630  
1 set Weatherstripping, at head, and Jambs x 628  
1 ea. Threshold, J36130 x 628  
2 ea. Stops, L11371 x 626 with stud and expansion shield

AHW-6 Door no. A110, A111, A113, A114

3 ea. Hinges, A2111 x 626  
1 ea. Lockset, F82 - Grade 1 x 626  
1 ea. Stops, L11371 x 626 with stud and expansion shield

AHW-7 Door no. A112  
  
By manufacturer

AHW-8 Door no. A115, A116, A120, A122, A123, A124, A125,  
A126, A129

3 ea. Hinges, A2111 x 626  
1 ea. Lockset, F82 - Grade 1 x 626  
1 ea. Stop, L12141 x 626 with stud and expansion shield

AHW-9 Door no. A117, 121

3 ea. Hinges, A2111 x 626  
1 ea. Lockset, F0786 - Grade 1 x 626  
1 ea. Closer, C72011 x 689  
1 ea. Kickplate, J102 x 626  
1 ea. Stop, L11371 x 626 with stud and expansion shield  
1 ea. Threshold, as detailed x vinyl

AHW-10 Door no. A118, A119

3 ea. Hinges, A5111 x 630  
1 ea. Push Plate, J301 x 630  
1 ea. Pull Plate, J407 x 630  
1 ea. Closer, C72011 x 689  
1 ea. Kickplate, J102 x 630  
1 ea. Threshold, as detailed x vinyl  
1 ea. Stop, L11371 x 626 with stud and expansion shield

AHW-11 Door no. A127, A128

3 ea. Hinges, A2111 x 626  
1 ea. Lockset, F86 - Grade 1 x 626  
1 ea. Overhead stop, C12541 x 626

## Toilet

LHW-1 Door no. L101

3 ea. Hinges, A5111 x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Closer, C07021 x 689  
1 ea. Kickplate, J102 x 630  
1 set Weatherstripping, at head, and Jambs x 628  
1 set Rain drip head, and door bottom x 628  
1 ea. Stop, L11371 x 626 with stud and expansion shield  
1 ea. Threshold, J36130 x 628

LHW-2 Door no. L102

3 ea. Hinges, A5111 x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Stop, L11371 x 626 with stud and expansion shield

#### Scale Shack

SHW-1 Door no. S101, S102

3 ea. Hinges, A5111 x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Closer, C72021 x 689  
1 ea. Kickplate, J102 x 630  
1 set Weatherstripping head and jambs x 628  
1 set Rain drip head, and door bottom x 628  
1 ea. Threshold, J36130 x 628  
1 ea. Stop, L11371 x 626 with stud and expansion shield

#### Engine Shop

EHW-1 Door no. E101, E102, E114

3 ea. Hinges, A5111 x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Closer, C72021 x 689  
1 ea. Kickplate, J102 x 630  
1 set Weatherstripping head and jambs  
1 set Rain drip head, and door bottom x 628  
1 ea. Threshold, J36130 x 628  
1 ea. Stop, L11371 x 626 with stud and expansion shield

EHW-2 Door no. E103, E113

By manufacturer

EHW-3 Door no. E104 (Fire Rated), E111 (Fire Rated)

3 ea. Hinges, A5111 (wide throw) x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Closer, C72021, PT-4G x 689  
1 ea. Kickplate, J102 x 630  
1 ea. Stop, L12111 x 626  
1 ea. Threshold, as detailed x vinyl (for door E104 only)

EHW-4 Door no. E105, E106

3 ea. Hinges, A5111 x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Closer, C72011, PT-4G x 689  
1 ea. Kickplate, J102 x 630  
1 ea. Stop, L12141 x 626  
1 ea. Threshold, as detailed x vinyl

EHW-5 Door no. E107 (Fire Rated)

3 ea. Hinges, A5111 (wide throw) x 630  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Closer, C72021, PT-4G x 689  
1 ea. Kickplate, J102 x 630  
1 ea. Stop, L12111 x 626

EHW-6 Door no. E109, E110

3 ea. Hinges, A5111, (wide throw) x 630 (for door E109 only)  
3 ea. Hinges, A5111 x 630 (for door E110 only)  
1 ea. Lockset, F82 - Grade 1 x 630  
1 ea. Closer, C72021 x 689  
1 ea. Kickplate, J102 x 630  
1 set Weatherstripping head and jambs  
1 set Rain drip head, and door bottom x 628  
1 ea. Door Sweep, R3C415 x 626  
1 ea. Threshold, J36130 x 628  
1 ea. Stop, L11371 x 630 with stud and expansion shield

EHW-7 Door no. E108, E112, E115

6 ea. Hinges, A5111, (wide throw) x 630 (for E112 and E115 only)  
6 ea. Hinges, A5111 x 630 (for E108 only)  
1 ea. Lockset, F82 - Grade 1 x 630  
2 ea. Closers, C72021 x 689  
2 ea. Kickplates, J102 x 630  
1 set Self Latching Extension Flush Bolt set (Type 27) x 630  
1 ea. Coordinator, Type 21A x 626  
1 ea. Dustproof strike, L04011 x 626  
1 set Weatherstripping head, jambs, and meeting stile x 628  
1 set Rain drip head, and door bottom x 628  
2 ea. Stops, L11371 x 630 with stud and expansion shield  
1 ea. Threshold, J32100 x 628  
2 ea. Door sweep, R3Y415 x 628

-- End of Section --

SECTION 08810

GLASS AND GLAZING  
**05/97AMENDMENT 00001**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; R 1994) Safety Performance  
Specifications and Methods of Test for  
Safety Glazing Materials Used in Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 509 (1994) Elastomeric Cellular Preformed  
Gasket and Sealing Material

ASTM C 669 (1995) Glazing Compounds for Back Bedding  
and Face Glazing of Metal Sash

ASTM C 864 (1999) Dense Elastomeric Compression Seal  
Gaskets, Setting Blocks, and Spacers

ASTM C 920 (1998) Elastomeric Joint Sealants

ASTM C 1036 (1991; R 1997) Flat Glass

ASTM C 1048 (1997b) Heat-Treated Flat Glass - Kind HS,  
Kind FT Coated and Uncoated Glass

ASTM C 1172 (1996e1) Laminated Architectural Flat Glass

ASTM C 1349 (1996) Architectural Flat Glass Clad  
Polycarbonate

ASTM D 395 (1998) Rubber Property - Compression Set

ASTM E 119 (1998) Fire Tests of Building Construction  
and Materials

ASTM E 773 (1997) Accelerated Weathering of Sealed  
Insulating Glass Units

ASTM E 774 (1997) Classification of the Durability of  
Sealed Insulating Glass Units

ASTM E 1300 (1998) Determining the Minimum Thickness  
and Type of Glass Required to Resist a  
Specified Load

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (1995) Minimum Design Loads for Buildings

and Other Structures

CODE OF FEDERAL REGULATIONS (CFR)

16 CFR 1201                      Safety Standard for Architectural Glazing  
Materials

COMMERCIAL ITEM DESCRIPTION (CID)

CID A-A-378                      (Basic) Putty Linseed Oil Type, (for  
Wood-Sash-Glazing)

GLASS ASSOCIATION OF NORTH AMERICA (GANA)

GANA Glazing Manual              (1997) Glazing Manual

GANA Standards Manual            (1995) Engineering Standards Manual

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80                          (1999) Fire Doors and Fire Windows

NFPA 252                          (1995) Fire Tests of Door Assemblies

NFPA 257                          (1996) Fire Tests for Window and Glass  
Block Assemblies

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation

Drawings showing complete details of the proposed setting methods, mullion details, edge blocking, size of openings, frame details, materials, and types and thickness of glass.

Control Tower Insulating Glass

Drawings showing complete details of the proposed setting methods, mullion details, edge blocking, size of openings, frame details, materials, and types and thickness of glass.

SD-03 Product Data

Insulating Glass  
Glazing Accessories

Manufacturer's descriptive product data, handling and storage recommendations, installation instructions, and cleaning instructions.

Mirrors;

SD-04 Samples

Insulating Glass

Two 203 x 254 mm samples of each of the following: tinted glass insulating glass units.

#### SD-07 Certificates

##### Insulating Glass

Certificates stating that the glass meets the specified requirements. Labels or manufacturers marking affixed to the glass will be accepted in lieu of certificates.

#### SD-11 Closeout Submittal

Warranty; G

### 1.3 SYSTEM DESCRIPTION

Glazing systems shall be fabricated and installed watertight and airtight to withstand thermal movement and wind loading without glass breakage, gasket failure, deterioration of glazing accessories, and defects in the work. Glazed panels shall comply with the safety standards, as indicated in accordance with ANSI Z97.1. Glazed panels shall comply with indicated wind/snow loading in accordance with ASTM E 1300.

### 1.4 DELIVERY, STORAGE AND HANDLING

Glazing compounds shall be delivered to the site in the manufacturer's unopened containers. Glass shall be stored indoors in a safe, well ventilated dry location in accordance with manufacturer's instructions, and shall not be unpacked until needed for installation. Glass shall not be stored on site over 1 month.

### 1.5 PROJECT/SITE CONDITIONS

Glazing work shall not be started until outdoor temperature is above 5 degrees C and rising, unless procedures recommended by glass manufacturer and approved by Contracting Officer are made to warm the glass and rabbet surfaces. Ventilation shall be provided to prevent condensation of moisture on glazing work during installation. Glazing work shall not be performed during damp or raining weather.

### 1.6 WARRANTY

#### 1.6.1 Insulating Glass

Manufacturer shall warrant the insulating glass to be free of fogging or film formation on the internal glass surfaces caused by failure of the hermetic seal for a period of 10 years from Date of Substantial Completion. Warranty shall be signed by manufacturer.

## PART 2 PRODUCTS

### 2.1 FLOAT GLASS

### 2.2 INSULATING GLASS

Insulating glass shall be Class A preassembled units of dual-seal construction consisting of lites of glass separated by an aluminum, steel, or stainless steel, spacer and dehydrated space conforming to ASTM E 773 and ASTM E 774. Spacer shall be roll-formed, with bent or tightly welded

or keyed and sealed joints to completely seal the spacer periphery and eliminate moisture and hydrocarbon vapor transmission into airspace through the corners. Primary seal shall be compressed polyisobutylene and the secondary seal shall be a specially formulated silicone. Glass types shall be as follows:

#### 2.2.1 Clear Insulating Glass

Glass for two-pane insulating units shall be Type I annealed glass, Class 1 - clear, Quality q3 - glazing select, conforming to ASTM C 1036. Glass performance shall be K-Value/Winter Nighttime AM 1 2.27 - 5.6789.

The insulating panels shall each be 5 mm (3/16 inch) with 13 mm (1/2 inch) air space between.

#### AM 1 2.2.2 Low-E Insulating Glass

Interior and exterior glass panes for Low-E insulating units shall be Type I annealed flat glass, Class 2-tinted with anti-reflective low-emissivity coating on No. 2 surface (inside surface of exterior pane), Quality q3 - glazing select, conforming to ASTM C 1036. Glass performance shall be K-Value/Winter Nighttime AM 1 2.27 - 5.678. Color shall be bronze.

#### 2.3 REFLECTIVE GLASS

##### 2.3.1 Low-Emissivity (Low-E) Glass

Low-emissivity (Low-E) glass shall be Type I annealed flat type, Class 2-tinted with low-emissivity coating on No. 2 surface (inside surface of exterior pane), Quality q3 - glazing select. Glass performance shall be K-Value/Winter Nighttime AM 1 2.27 - 5.678. Color shall be bronze.

#### 2.4 MIRRORS

##### 2.4.1 Glass Mirrors

Glass for mirrors shall be Type I transparent flat type, Class [1-clear], Glazing Quality q1 6 mm (1/4 inch) thick conforming to ASTM C 1036. Glass color shall be [[clear]. Glass shall be coated on one surface with silver coating, copper protective coating, and mirror backing paint. Silver coating shall be highly adhesive pure silver coating of a thickness which shall provide reflectivity of 83 percent or more of incident light when viewed through 6 mm (1/4 inch) thick glass, and shall be free of pinholes or other defects. Copper protective coating shall be pure bright reflective copper, homogeneous without sludge, pinholes or other defects, and shall be of proper thickness to prevent "adhesion pull" by mirror backing paint. Mirror backing paint shall consist of two coats of special scratch and abrasion-resistant paint, and shall be baked in uniform thickness to provide a protection for silver and copper coatings which will permit normal cutting and edge fabrication.

##### 2.4.2 Mirror Accessories

###### 2.4.2.1 Mirror Frames

Mirrors shall be provided with mirror frames (J-mold channels) fabricated of one-piece roll-formed Type 304 stainless steel with No. 4 brushed satin finish and concealed fasteners which will keep mirrors snug to wall. Frames shall be 32 x 6 x 6 mm (1-1/4 x 1/4 x 1/4 inch) continuous at top and bottom of mirrors. Concealed fasteners of type to suit wall construction material shall be provided with mirror frames.

#### 2.5 GLAZING ACCESSORIES

### 2.5.1 Preformed Tape

Preformed tape shall be elastomeric rubber extruded into a ribbon of a width and thickness suitable for specific application. Tape shall be of type which will remain resilient, have excellent adhesion, and be chemically compatible to glass, metal, or wood.

### 2.5.2 Sealant

Sealant shall be elastomeric conforming to ASTM C 920, Type S or M, Grade NS, Class 12.5, Use G, of type chemically compatible with setting blocks, preformed sealing tape and sealants used in manufacturing insulating glass. Color of sealant shall be **AM 1 bronze**.

### 2.5.3 Glazing Gaskets

Glazing gaskets shall be extruded with continuous integral locking projection designed to engage into metal glass holding members to provide a watertight seal during dynamic loading, building movements and thermal movements. Glazing gaskets for a single glazed opening shall be continuous one-piece units with factory-fabricated injection-molded corners free of flashing and burrs. Glazing gaskets shall be in lengths or units recommended by manufacturer to ensure against pull-back at corners. Glazing gasket profiles shall be as indicated on drawings.

#### 2.5.3.1 Fixed Glazing Gaskets

Fixed glazing gaskets shall be closed-cell (sponge) smooth extruded compression gaskets of cured elastomeric virgin neoprene compounds conforming to ASTM C 509, Type 2, Option 1.

#### 2.5.3.2 Wedge Glazing Gaskets

Wedge glazing gaskets shall be high-quality extrusions of cured elastomeric virgin neoprene compounds, ozone resistant, conforming to ASTM C 864, Option 1, Shore A durometer between 65 and 75.

#### 2.5.3.3 Aluminum Framing Glazing Gaskets

Glazing gaskets for aluminum framing shall be permanent, elastic, non-shrinking, non-migrating, watertight and weathertight.

### 2.5.4 Putty and Glazing Compound

Glazing compound shall conform to ASTM C 669 for face-glazing metal sash. Putty shall be linseed oil type conforming to CID A-A-378 for face-glazing primed wood sash. Putty and glazing compounds shall not be used with insulating glass or laminated glass.

### 2.5.5 Setting and Edge Blocking

Neoprene setting blocks shall be dense extruded type conforming to ASTM D 395, Method B, Shore A durometer between 70 and 90. Edge blocking shall be Shore A durometer of 50 (+ or - 5). Silicone setting blocks shall be required when blocks are in contact with silicone sealant. Profiles, lengths and locations shall be as required and recommended in writing by glass manufacturer.

## PART 3 EXECUTION

### 3.1 PREPARATION

Openings and framing systems scheduled to receive glass shall be examined

for compliance with approved shop drawings, GANA Glazing Manual and glass manufacturer's recommendations including size, squareness, offsets at corners, presence and function of weep system, face and edge clearance requirements and effective sealing between joints of glass-framing members. Detrimental materials shall be removed from glazing rabbet and glass surfaces and wiped dry with solvent. Glazing surfaces shall be dry and free of frost.

### 3.2 INSTALLATION

Glass and glazing work shall be performed in accordance with approved shop drawings, GANA Glazing Manual, glass manufacturer's instructions and warranty requirements. Glass shall be installed with factory labels intact and removed only when instructed. Wired glass and fire/safety rated glass shall be installed in accordance with NFPA 80. Edges and corners shall not be ground, nipped or cut after leaving factory. Springing, forcing or twisting of units during installation will not be permitted.

### 3.3 CLEANING

Upon completion of project, outside surfaces of glass shall be washed clean and the inside surfaces of glass shall be washed and polished in accordance with glass manufacturer's recommendations.

### 3.4 PROTECTION

Glass work shall be protected immediately after installation. Glazed openings shall be identified with suitable warning tapes, cloth or paper flags, attached with non-staining adhesives. Reflective glass shall be protected with a protective material to eliminate any contamination of the reflective coating. Protective material shall be placed far enough away from the coated glass to allow air to circulate to reduce heat buildup and moisture accumulation on the glass. Glass units which are broken, chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.

-- End of Section --

## SECTION 09310

## CERAMIC TILE

07/98

**AMENDMENT 0001**

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A108.1A	(1992) Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar
ANSI A108.1B	(1992) Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar
ANSI A108.4	(1992) Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive
ANSI A108.5	(1992) Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar
ANSI A108.6	(1992) Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy
ANSI A108.7	(1992) Electrically Conductive Ceramic Tile Installed with Conductive Dry-Set Portland Cement Mortar
ANSI A108.8	(1992) Installation of Ceramic Tile with Chemical Resistant Furan Mortar and Grout
ANSI A108.10	(1992) Installation of Grout in Tilework
ANSI A118.1	(1992) Dry-Set Portland Cement Mortar
ANSI A118.2	(1992) Conductive Dry-Set Portland Cement Mortar
ANSI A118.3	(1992) Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive
ANSI A118.4	(1992) Latex-Portland Cement Mortar
ANSI A118.5	(1992) Chemical Resistant Furan Mortars and Grouts for Tile
ANSI A118.6	(1992) Ceramic Tile Grouts

ANSI A118.9	(1992) Cementitious Backer Units
ANSI A136.1	(1992) Organic Adhesives for Installation of Ceramic Tile
ANSI A137.1	(1988) Ceramic Tile

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185	(1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM C 33	(1997) Concrete Aggregates
ASTM C 144	(1997) Aggregate for Masonry Mortar
ASTM C 150	(1997) Portland Cement
ASTM C 206	(1984; R 1997) Finishing Hydrated Lime
ASTM C 207	(1991; R 1997) Hydrated Lime for Masonry Purposes
ASTM C 241	(1990) Abrasion Resistance of Stone Subjected to Foot Traffic
ASTM C 373	(1988; R 1994) Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products
ASTM C 648	(1998) Breaking Strength of Ceramic Tile
ASTM C 847	(1995) Metal Lath
ASTM C 1026	(1987; R 1996) Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling
ASTM C 1027	(1984; R 1990) Determining Visible Abrasion Resistance of Glazed Ceramic Tile
ASTM C 1028	(1996) Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
ASTM C 1178/C 1178M	(1996) Glass Mat Water-Resistant Gypsum Backing Panel

## MARBLE INSTITUTE OF AMERICA (MIA)

MIA Design Manual	(1991) Design Manual IV Dimensional Stone
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## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 99	(1999) Health Care Facilities
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## TILE COUNCIL OF AMERICA (TCA)

TCA Hdbk	(1997) Handbook for Ceramic Tile Installation
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## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

### SD-03 Product Data

Tile; G  
Setting-Bed; G  
Mortar, Grout, and Adhesive; G

Manufacturer's catalog data.

Tile; G  
Mortar and Grout; G

Manufacturers preprinted installation and cleaning instructions.

### SD-04 Samples

Tile; G  
Accessories; G  
Marble Thresholds; G

Samples of sufficient size to show color range, pattern, type and joints.

### SD-06 Test Reports

Testing; G

Copy of results for electrical resistance tests.

### SD-07 Certificates

Tile; G  
Mortar, Grout, and Adhesive; G

Certificates indicating conformance with specified requirements. A master grade certificate shall be furnished for tile.

## 1.3 DELIVERY AND STORAGE

Materials shall be delivered to the project site in manufacturer's original unopened containers with seals unbroken and labels and hallmarks intact. Materials shall be kept dry, protected from weather, and stored under cover in accordance with manufacturer's instructions. Extra flooring material shall be furnished. A minimum of 5 percent of total mm of each tile type, pattern and color shall be provided.

## 1.4 ENVIRONMENTAL REQUIREMENTS

Ceramic tile work shall not be performed unless the substrate and ambient temperature is at least 10 degrees C and rising. Temperature shall be maintained above 10 degrees C while the work is being performed and for at least 7 days after completion of the work. When temporary heaters are used they shall be vented to the outside to avoid carbon dioxide damage to new tilework.

## 1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1-year period shall be provided.

## PART 2 PRODUCTS

### 2.1 TILE

Tile shall be standard grade conforming to ANSI A137.1. Containers shall be grade sealed. Seals shall be marked to correspond with the marks on the signed master grade certificate. Tile shall be impact resistant with a minimum breaking strength for wall tile of 41 kg AM 1 and 113 kg for floor tile in accordance with ASTM C 648. Tile for cold climate projects shall be rated frost resistant by the manufacturer as determined by ASTM C 1026. Water absorption shall be 0.50 maximum percent in accordance with ASTM C 373. Floor tile shall have a minimum coefficient of friction of 0.60 wet and dry in accordance with ASTM C 1028. Floor tile shall be Class AM 1 IV-Heavy Traffic, durability classification as rated by the manufacturer when tested in accordance with ASTM C 1027 for abrasion resistance as related to foot traffic. Floor tile shall comply with A.D.A recommendations for accessible routes.

#### 2.1.1 Mosaic Tile

Ceramic mosaic tile and trim shall be unglazed AM 1 porcelain unpolished and polished with sharply formed face. Tile size shall be 50 x 50 mm. Color shall be in accordance with Section 09915 COLOR SCHEDULE.

#### 2.1.2 Porcelain Tile

Porcelain tile and trim shall be polished, unpolished and textured. Tile shall be 300 x 300 x 13 mm. Color shall be in accordance with Section 09915 COLOR SCHEDULE.

### AM 1 2.2 SETTING-BED

The setting-bed shall be composed of the following:

#### 2.2.1 Aggregate for Concrete Fill

Aggregate shall conform to ASTM C 33. Maximum size of coarse aggregate shall not be greater than one-half the thickness of concrete fill.

#### 2.2.2 Portland Cement

Cement shall conform to ASTM C 150, Type I, white for wall mortar and gray for other uses.

#### 2.2.3 Sand

Sand shall conform to ASTM C 144.

#### 2.2.4 Hydrated Lime

Hydrated lime shall conform to ASTM C 206, Type S or ASTM C 207, Type S.

#### 2.2.5 Metal Lath

Metal lath shall be flat expanded type conforming to ASTM C 847, and weighing not less than 1.4 kg/square meter.

#### 2.2.6 Reinforcing Wire Fabric

Wire fabric shall conform to ASTM A 185. Wire shall be either 50 x 50 mm mesh, 16/16 wire or 38 x 50 mm mesh, 16/13 wire.

### 2.3 WATER

Water shall be potable.

### 2.4 MORTAR, GROUT, AND ADHESIVE

Mortar, grout, and adhesive shall conform to the following:

#### 2.4.1 Dry-Set Portland Cement Mortar

ANSI A118.1.

#### 2.4.2 Latex-Portland Cement Mortar

ANSI A118.4.

#### 2.4.3 Ceramic Tile Grout

ANSI A118.6; AM 1 latex modified -portland cement grout.

#### AM 1 2.4.4 Cementitious Backer Board

AM 1 Cementitious backer units shall be 16mm mm thick. Backer board shall have gypsum core with fiberglass mat surfaces (2 sides) with water and vapor retardant on face side.

#### AM 1 2.5 MARBLE THRESHOLDS

Marble thresholds shall be of size required by drawings or conditions. Marble shall be Group A as classified by MIA Design Manual. Marble shall have a fine sand-rubbed finish and shall be AM 1 gray in color as approved by the Contracting Officer. Marble abrasion shall be not less than 12.0 when tested in accordance with ASTM C 241.

## PART 3 EXECUTION

### 3.1 PREPARATORY WORK AND WORKMANSHIP

Surface to receive tile shall be inspected and shall conform to the requirements of ANSI A108.1A or ANSI A108.1B for surface conditions for the type setting bed specified and for workmanship. Variations of surface to be tiled shall fall within maximum values shown below:

TYPE	WALLS	FLOORS
Dry-Set Mortar	3 mm in 2.4 meters	3.0 mm in 3 meters
Organic Adhesives	3 mm in 2.4 meters	1.5 mm in 1 meters
Latex portland cement mortar	3 mm in 2.4 meters	3.0 mm in 3 meters
Epoxy	3 mm in 2.4 meters	3.0 mm in 3 meters

### 3.2 GENERAL INSTALLATION REQUIREMENTS

Tile work shall not be started until roughing in for mechanical and electrical work has been completed and tested, and built-in items requiring membrane waterproofing have been installed and tested. Floor tile installation shall not be started in spaces requiring wall tile until after wall tile has been installed. Tile in colors and patterns indicated shall be applied in the area shown on the drawings. Tile shall be installed with the respective surfaces in true even planes to the elevations and grades shown. Special shapes shall be provided as required for sills, jambs,

recesses, offsets, external corners, and other conditions to provide a complete and neatly finished installation. Tile bases and coves shall be solidly backed with mortar.

### 3.3 INSTALLATION OF WALL TILE

Wall tile shall be installed in accordance with the TCA Hdbk, method W202-2K.

**AM 1 A GROUT RELEASE SIMILAR OR EQUAL TO DAL-TILE AQUZ MIX SHALL BE APPLIED PRIOR TO GROUTING. THE GROUT RELEASE SHALL BE REMOVED ACCORDING TO MANUFACTURER'S INSTRUCTIONS. GROUT TO BE SEALED WITH DOMINION PENATRATING CONCRETE SEALER OR AN EQUAL. TILE IS NOT TO BE SEALED.**

#### 3.3.1 [Enter Appropriate Subpart Title Here] **AM 1** 3.3.2 Dry-Set Mortar and Latex-Portland Cement Mortar

Dry-set or Latex modified-portland cement shall be used to install tile in accordance with ANSI A108.5. Latex portland cement shall be used when installing porcelain ceramic tile.

#### **AM 1** 3.4 INSTALLATION OF FLOOR TILE

Floor tile shall be installed in accordance with TCA Hdbk, method F122-2K (Waterproof Membrane). Shower receptors shall be installed in accordance with TCA Hdbk, method B415. **AM 1 A GROUT RELEASE SIMILAR OR EQUAL TO DAL-TILE AQUA MIX SHALL BE APPLIED PRIOR TO GROUTING. THE GROUT RELEASE SHALL BE REMOVED ACCORDING TO MANUFACTURER'S INSTRUCTION. GROUT TO BE SEALED WITH DOMINION PENATRATING CONCRETE SEALER OR AN EQUAL. TILE IS NOT BE BE SEALED.**

#### **AM 1** 3.4.1 Dry-Set and Latex-Portland Cement

Dry-set or Latex modified-portland cement mortar shall be used to install tile directly over properly cured, plane, clean concrete slabs in accordance with ANSI A108.5. Latex portland cement shall be used when installing porcelain ceramic tile.

#### **AM 1** 3.4.2 Ceramic Tile Grout

Ceramic Tile grout shall be prepared and installed in accordance with ANSI A108.10.

#### 3.4.3 Waterproofing

Shower pans are specified in Section 15400 PLUMBING, GENERAL PURPOSE. Waterproofing under concrete fill shall conform to the requirements of Section 07132 BITUMINOUS WATERPROOFING.

#### 3.4.4 Concrete Fill

**AM 1** Concrete fill shall be composed by volume of 1 part portland cement to 3 parts fine aggregate to 4 parts coarse aggregate, and mixed with water to as dry a consistency as practicable. The fill shall be spread, tamped, and screeded to a true plane, and pitched to drains or leveled as shown. Concrete fill shall be thoroughly damp cured before application of setting-bed material. Concrete fill shall be reinforced with one layer of reinforcement, with the uncut edges lapped the width of one mesh and the cut ends and edges lapped not less than 50 mm. Laps shall be tied together with 1.3 mm (18 gauge) wire every 250 mm along the finished edges and every 150 mm along the cut ends and edges. The reinforcement shall be supported and secured in the centers of concrete fills. The mesh shall be continuous; except where expansion joints occur, mesh shall be cut and discontinued across such joints. Reinforced concrete fill shall be provided under the setting-bed where the distance between the

under-floor surface and the finished tile floor surface is 50 mm or greater, and shall be of such thickness that the mortar setting-bed over the concrete fill shall be not less nor more than the thickness required in the specified TCA Hdbk methods.

**AM 1** 3.5 INSTALLATION OF MARBLE THRESHOLDS

Thresholds shall be installed where indicated in a manner similar to that of the ceramic tile floor. Thresholds shall be the full width of the opening. Head joints at ends shall not exceed 6 mm in width and shall be grouted full as specified for ceramic tile.

3.6 TESTING

Electrical resistance tests shall be performed on conductive flooring in the presence of the Contracting Officer by a technician experienced in such work and a copy of the test results shall be furnished. Test procedures, testing apparatus, and test results shall be in accordance with the provisions for Conductive Flooring in NFPA 99.

3.7 EXPANSION JOINTS

Joints shall be formed as indicated and sealed as specified in Section 07900 JOINT SEALING.

3.7.1 Walls

Expansion joints shall be provided at control joints in backing material. Wherever backing material changes, an expansion joint shall be installed to separate the different materials.

3.7.2 Floors

Expansion joints shall be provided over construction joints, control joints, and expansion joints in concrete slabs. Expansion joints shall be provided where tile abuts restraining surfaces such as perimeter walls, curbs and columns and at intervals of 7.2 to 10.8 m each way in large interior floor areas and 3.6 to 4.8 m each way in large exterior areas or areas exposed to direct sunlight or moisture. Expansion joints shall extend through setting-beds and fill.

3.8 CLEANING AND PROTECTING

Upon completion, tile surfaces shall be thoroughly cleaned AM 1 WITH DOMINION PRO-TILE 700 OR AN EQUAL IN ACCORDANCE WITH MANUFACTURER'S APPROVED CLEANING INSTRUCTIONS. IF A HAZE EXISTS AFTER A THOROUGH CLEANING, DOMINION CERA-HAZE OR AN EQUAL IS TO BE USED. ACID SHALL NOT BE USED FOR CLEANING GLAZED TILE. AFTER THE GROUT HAS SET, GROUT TO BE SEALED.

Tiled floor areas shall be covered with building paper before foot traffic is permitted over the finished tile floors. Board walkways shall be laid on tiled floors that are to be continuously used as passageways by workmen. Damaged or defective tiles shall be replaced.

-- End of Section --

SECTION 09510

ACOUSTICAL CEILINGS

08/96

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 635	(1995) Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
ASTM C 636	(1996) Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
ASTM E 119	(1995a) Fire Tests of Building Construction and Materials
ASTM E 1264	(1990) Standard Classification for Acoustical Ceiling Products
ASTM E 1414	(1991a) Standard Test for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

UNDERWRITERS LABORATORIES (UL)

UL Fire Resist Dir	(1997) Fire Resistance Directory (2 Vol)
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1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Approved Detail Drawings; GA

Drawings showing suspension system, method of anchoring and fastening, details, and reflected ceiling plan.

SD-03 Product Data

Acoustical Ceiling Systems; GA

Manufacturer's descriptive data, catalog cuts, and installation instructions. Submittals which do not provide adequate data for

the product evaluation will be rejected.

#### SD-04 Samples

##### Acoustical Units; GA

Two samples of each type of acoustical unit and each type of suspension grid tee section showing texture, finish, and color.

#### SD-06 Test Reports

##### Fire Resistive Ceilings Ceiling Attenuation Class and Test

Reports by an independent testing laboratory attesting that acoustical ceiling systems meet specified fire endurance and sound transmission requirements. Data attesting to conformance of the proposed system to Underwriters Laboratories requirements for the fire endurance rating listed in UL Fire Resist Dir may be submitted in lieu of test reports.

#### SD-07 Certificates

##### Acoustical Units; GA

Certificate attesting that the mineral based acoustical units furnished for the project contains recycled material and showing an estimated percent of such material.

### 1.3 GENERAL REQUIREMENTS

Acoustical treatment shall consist of sound controlling units mechanically mounted on a ceiling suspension system. The unit size, texture, finish, and color shall be as specified. The Contractor has the option to substitute inch-pound (I-P) Recessed Light Fixtures (RLF) for metric RLF. If the Contractor opts to furnish I-P RLF, other ceiling elements like acoustical ceiling tiles, air diffusers, air registers and grills, shall also be I-P products. The Contractor shall coordinate the whole ceiling system with other details, like the location of access panels and ceiling penetrations, etc., shown on the drawings. If I-P products are used, the Contractor shall be responsible for all associated labor and materials and for the final assembly and performance of the specified work and products. The location and extent of acoustical treatment shall be as shown on the approved detail drawings.

### 1.4 DELIVERY AND STORAGE

Materials shall be delivered to the site in the manufacturer's original unopened containers with brand name and type clearly marked. Materials shall be carefully handled and stored in dry, watertight enclosures. Immediately before installation, acoustical units shall be stored for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed in order to assure proper temperature and moisture acclimation.

### 1.5 ENVIRONMENTAL REQUIREMENTS

A uniform temperature of not less than 16 degrees C nor more than 29 degrees C and a relative humidity of not more than 70 percent shall be maintained before, during, and after installation of acoustical units.

### 1.6 SCHEDULING

Interior finish work such as plastering, concrete and terrazzo work shall be complete and dry before installation. Mechanical, electrical, and other work above the ceiling line shall be completed and heating, ventilating, and air conditioning systems shall be installed and operating in order to maintain temperature and humidity requirements.

#### 1.7 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided. Standard performance guarantee or warranty shall contain an agreement to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to, sagging and warping of panels; rusting and manufacturers defects of grid system.

#### 1.8 EXTRA MATERIALS

Spare tiles of each color shall be furnished at the rate of 20 tiles for each 1000 tiles installed. Tiles shall be from the same lot as those installed.

### PART 2 PRODUCTS

#### 2.1 ACOUSTICAL UNITS

Acoustical units shall conform to ASTM E 1264, Class A, and the following requirements:

##### 2.1.1 Units for Exposed-Grid System

Type: IV (mineral fiber with membrane-faced overlay). Type IV acoustical units shall have a minimum recycled material content of 18 percent.

Minimum NRC: .70 when tested on mounting No. E-400

Pattern: E.

Nominal size: 600 by 600 mm.

Edge detail: Beveled Tegalur.

Finish: Factory-applied standard finish.

Minimum LR coefficient: .89.

Minimum CAC: 35.

#### 2.2 SUSPENSION SYSTEM

Suspension system shall be standard exposed-grid standard width flange, and shall conform to ASTM C 635. Surfaces exposed to view shall be aluminum or steel with a factory-applied white baked-enamel finish. Wall molding shall have a flange of not less than 23 mm. Inside and outside corner caps Standard corners shall be provided. Suspended ceiling framing system shall have the capability to support the finished ceiling, light fixtures, air diffusers, and accessories, as shown. The suspension system shall have a maximum deflection of 1/360 of span length. Seismic details shall conform to the guidance in TI 809-04 and ASTM E 580.

#### 2.3 HANGERS

Hangers shall be galvanized steel wire. Hangers and attachment shall support a minimum 1330 N ultimate vertical load without failure of

supporting material or attachment.

## 2.4 ACCESS PANELS

Access panels shall match adjacent acoustical units and shall be designed and equipped with suitable framing and fastenings for removal and replacement without damage. Panel shall be not less than 600 by 600 mm or more than 600 by 1220 mm. An identification plate of 0.8 mm thick aluminum, 19 mm in diameter, stamped with the letters "AP" and finished the same as the unit, shall be attached near one corner on the face of each access panel.

## 2.5 FINISHES

Acoustical units and suspension system members shall have manufacturer's standard textures, patterns and finishes as specified. Ceiling suspension system components shall be treated to inhibit corrosion.

## 2.6 COLORS AND PATTERNS

Colors and patterns for acoustical units and suspension system components shall be as specified in Section 09915 COLOR SCHEDULE.

## 2.7 CEILING ATTENUATION CLASS AND TEST

Ceiling attenuation class (CAC) range of acoustical units, when required, shall be determined in accordance with ASTM E 1414. Test ceiling shall be continuous at the partition and shall be assembled in the suspension system in the same manner that the ceiling will be installed on the project. System shall be tested with all acoustical units installed.

# PART 3 EXECUTION

## 3.1 INSTALLATION

Acoustical work shall be provided complete with necessary fastenings, clips, and other accessories required for a complete installation. Mechanical fastenings shall not be exposed in the finished work. Hangers shall be laid out for each individual room or space. Hangers shall be placed to support framing around beams, ducts, columns, grilles, and other penetrations through ceilings. Main runners and carrying channels shall be kept clear of abutting walls and partitions. At least two main runners shall be provided for each ceiling span. Wherever required to bypass an object with the hanger wires, a subsuspension system shall be installed, so that all hanger wires will be plumb.

### 3.1.1 Suspension System

Suspension system shall be installed in accordance with ASTM C 636 and as specified herein. There shall be no hanger wires or other loads suspended from underside of steel decking.

#### 3.1.1.1 Plumb Hangers

Hangers shall be plumb and shall not press against insulation covering ducts and pipes.

### 3.1.2 Wall Molding

Wall molding shall be provided where ceilings abut vertical surfaces. Wall molding shall be secured not more than 75 mm from ends of each length and not more than 400 mm on centers between end fastenings. Wall molding springs shall be provided at each acoustical unit in semi-exposed or

concealed systems.

### 3.1.3 Acoustical Units

Acoustical units shall be installed in accordance with the approved installation instructions of the manufacturer. Edges of acoustical units shall be in close contact with metal supports, with each other, and in true alignment. Acoustical units shall be arranged so that units less than one-half width are minimized. Units in exposed-grid system shall be held in place with manufacturer's standard hold-down clips, if units weigh less than 5 kg per square m or if required for fire resistance rating. In entrances and vestibules hold down clips will be required to prevent uplift.

### 3.2 CEILING ACCESS PANELS

Ceiling access panels shall be located directly under the items which require access.

### 3.3 CLEANING

Following installation, dirty or discolored surfaces of acoustical units shall be cleaned and left free from defects. Units that are damaged or improperly installed shall be removed and new units provided as directed.

**AM 1 In entrances and vestibules hold-down clips shall be installed to prevent uplift of tiles.**

-- End of Section --

SECTION 09650

RESILIENT FLOORING

07/96

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 2240	(1997) Rubber Property - Durometer Hardness
ASTM D 4078	(1992; R 1996) Water Emulsion Floor Polish
ASTM E 648	(1997) Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
ASTM E 662	(1995) Specific Optical Density of Smoke Generated by Solid Materials
ASTM F 1066	(1995a) Vinyl Composition Floor Tile
ASTM F 1303	(1997) Sheet Vinyl Floor Covering with Backing
ASTM F 1344	(1993) Rubber Floor Tile
ASTM F 1700	(1996) Solid Vinyl Floor Tile

1.2 FIRE RESISTANCE REQUIREMENTS

Flooring in corridors and exits shall have a minimum average critical radiant flux of 0.22 watts per square centimeter when tested in accordance with ASTM E 648. The smoke density rating shall be less than 450 when tested in accordance with ASTM E 662.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Resilient Flooring and Accessories; GA

Manufacturer's descriptive data and installation instructions  
including cleaning and maintenance instructions.

SD-04 Samples

Flooring; GA

Three samples of each indicated color and type of flooring and base. Sample size shall be minimum 60 x 100 mm.

SD-06 Test Reports

Moisture Test; GA

Copies of test reports showing that representative product samples of the flooring proposed for use have been tested by an independent testing laboratory within the past three years or when formulation change occurred and conforms to the requirements specified.

1.4 DELIVERY AND STORAGE

Materials shall be delivered to the building site in original unopened containers bearing the manufacturer's name, project identification, and handling instructions. Materials shall be stored in a clean dry area with temperature maintained above 21 degrees C for 2 days prior to installation, and shall be stacked according to manufacturer's recommendations. Materials shall be protected from the direct flow of heat from hot-air registers, radiators and other heating fixtures and appliances.

1.5 ENVIRONMENTAL REQUIREMENTS

Areas to receive resilient flooring shall be maintained at a temperature above 21 degrees C and below 38 degrees C for 2 days before application, during application and 2 days after application. A minimum temperature of 13 degrees C shall be maintained thereafter.

1.6 SCHEDULING

Resilient flooring application shall be scheduled after the completion of other work which would damage the finished surface of the flooring.

1.7 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.8 EXTRA MATERIALS

**AM 1 Extra flooring material of each color and pattern shall be furnished in the amount of one case of unused tile.** Extra materials shall be from the same lot as those installed. Extra base material composed of 6 m of each color shall be furnished.

PART 2 PRODUCTS

2.1 VINYL-COMPOSITION TILE TYPE

Vinyl-composition tile shall conform to ASTM F 1066, Class 2, (through pattern tile), Composition 1, asbestos-free, and shall be 300 mm square and 3.2 mm thick. Tile shall have the color and pattern uniformly distributed throughout the thickness of the tile. Flooring in any one continuous area shall be from the same lot and shall have the same shade and pattern.

2.2 RESILIENT BASE

Base shall be manufacturers standard rubber, straight style with a toeless

look(installed with carpet) coved style (installed with resilient flooring) .  
Base shall be 100 mm high and a minimum 3 mm thick. Job Formed corners shall be furnished.

## 2.3 FEATURE STRIP

Feature strips shall be rubber, 25 mm wide, and of thickness to match the flooring. Color shall be as indicated.

## 2.4 AM1 TRANSITION STRIP

Where differing flooring materials meet, a rubber transition strip tapered to meet abutting material shall be provided.

## 2.5 ADHESIVE

Adhesive for flooring and wall base shall be as recommended by the flooring manufacturer.

## 2.6 POLISH

Polish shall conform to ASTM D 4078.

## 2.7 CAULKING AND SEALANTS

Caulking and sealants shall be in accordance with Section 07900 JOINT SEALING.

## 2.8 MANUFACTURER'S COLOR AND TEXTURE

Color and texture shall be in accordance with Section 09915 COLOR SCHEDULE.

# PART 3 EXECUTION

## 3.1 EXAMINATION/VERIFICATION OF CONDITIONS

The Contractor shall examine and verify that site conditions are in agreement with the design package and shall report all conditions that will prevent a proper installation. The Contractor shall not take any corrective action without written permission from the Government.

## 3.2 SURFACE PREPARATION

Flooring shall be in a smooth, true, level plane, except where indicated as sloped. Before any work under this section is begun, all defects such as rough or scaling concrete, low spots, high spots, and uneven surfaces shall have been corrected, and all damaged portions of concrete slabs shall have been repaired as recommended by the flooring manufacturer. Concrete curing compounds, other than the type that does not adversely affect adhesion, shall be entirely removed from the slabs. Paint, varnish, oils, release agents, sealers, waxers, and adhesives shall be removed, as recommended by the flooring manufacturer.

## 3.3 MOISTURE TEST

The suitability of the concrete subfloor for receiving the resilient flooring with regard to moisture content shall be determined by a moisture test as recommended by the flooring manufacturer.

## 3.4 INSTALLATION OF VINYL-COMPOSITION TILE AND SOLID VINYL TILE

Tile flooring shall be installed with adhesive in accordance with the manufacturer's installation instructions. Tile lines and joints shall be

kept square, symmetrical, tight, and even. Edge width shall vary as necessary to maintain full-size tiles in the field, but no edge tile shall be less than one-half the field tile size, except where irregular shaped rooms make it impossible. Flooring shall be cut to, and fitted around, all permanent fixtures, built-in furniture and cabinets, pipes, and outlets. Edge tile shall be cut, fitted, and scribed to walls and partitions after field flooring has been applied with caulk to match color of resilient base.

### 3.5 INSTALLATION OF FEATURE STRIPS

Edge strips shall be secured with adhesive as recommended by the manufacturer. Edge strips shall be provided at locations where flooring termination is higher than the adjacent finished flooring, except at doorways where thresholds are provided.

### 3.6 INSTALLATION OF RESILIENT BASE

Wall base shall be installed with adhesive in accordance with the manufacturer's written instructions. Base joints shall be tight and base shall be even with adjacent resilient flooring. Voids along the top edge of base at masonry walls shall be filled with caulk.

### 3.7 CLEANING

Immediately upon completion of installation of tile in a room or an area, flooring and adjacent surfaces shall be cleaned to remove all surplus adhesive. After installation, flooring shall be washed with a cleaning solution, rinsed thoroughly with clear cold water, and, except for raised pattern rubber flooring, rubber tile and sheet rubber flooring, rubber stair treads, and static control vinyl tile, given two coats of polish in accordance with manufacturers written instructions. After each polish coat, floors shall be buffed to an even luster with an electric polishing machine. Raised pattern rubber flooring, rubber tile and sheet rubber flooring, rubber stair treads, and static control vinyl tile shall be cleaned and maintained as recommended by the manufacturer.

### 3.8 PROTECTION

From the time of laying until acceptance, flooring shall be protected from damage by AM 1 covering entire flooring with 6 mil plastic sheeting secured to the tile by duct tape to hold in place. Flooring which becomes damaged, loose, broken, or curled shall be removed and replaced.

-- End of Section --

SECTION 09680

CARPET

10/00

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC TM 16	(1998) Test Method: Colorfastness to Light
AATCC TM 134	(1996) Test Method: Electrostatic Propensity of Carpets
AATCC TM 165	(1999) Test Method: Colorfastness to Crocking: Carpets - AATCC Crockmeter Method

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 297	(1993; R 1998) Rubber Products - Chemical Analysis
ASTM D 418	(1993; R 1997) Pile Yarn Floor Covering Construction
ASTM D 1423	(1999) Twist in Yarns by the Direct-Counting Method
ASTM D 1667	(1997) Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)
ASTM D 3278	(1996e1) Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus
ASTM D 3676	(1996a) Rubber Cellular Cushion Used for Carpet or Rug Underlay
ASTM D 5252	(1998a) Standard Practice for the Operation of the Hexapod Drum Tester
ASTM D 5417	(1999) Standard Practice for Operation of the Vettermann Drum Tester
ASTM E 648	(1999) Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

CARPET AND RUG INSTITUTE (CRI)

CRI 104	(1996) Commercial Carpet Installation Standard
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CODE OF FEDERAL REGULATIONS (CFR)

16 CFR 1630	Standard for the Surface Flammability of Carpet and Rugs (FF 1-70)
40 CFR 247	Guidelines for Procurement of Products that contain Recycled Material

GERMANY INSTITUTE FOR STANDARDIZATION (DIN)

DIN 54318	(1986) Machine-Made Textile Floor Coverings; Determination of Dimensional Changes Due to the Effects of Varied Water and Heat Conditions; Identical with ISO 2551 Edition 1981
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1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation; GA  
Molding; GA

Three copies of drawings indicating areas receiving carpet, carpet types, textures and patterns, direction of pile, location of seams, and locations of edge molding.

SD-03 Product Data

Carpet; GA

Manufacturer's catalog data and printed documentation stating physical characteristics, durability, resistance to fading, and flame resistance characteristics for each type of carpet material and installation accessory.

Surface Preparation; GA  
Installation;

Three copies of the manufacturer's printed installation instructions for the carpet, including preparation of substrate, seaming techniques, and recommended adhesives and tapes.

Regulatory Requirements; GA

Three copies of report stating that carpet contains recycled materials and/or involvement in a recycling or reuse program. Report shall include percentage of recycled material.

Warranty; GA

SD-04 Samples

Carpet; GA  
Molding; GA

a. Carpet: Two "Production Quality" samples AM 1500mm X 500mm of each carpet proposed for use, showing quality, pattern, and color specified.

b. Vinyl or Aluminum Moldings: Two pieces of each type at least 300 mm long.

c. Special Treatment Materials: Two samples showing system and installation method.

#### SD-06 Test Reports

Moisture and Alkalinity Tests; GA

Three copies of test reports of moisture and alkalinity content of concrete slab stating date of test, person conducting the test, and the area tested.

#### SD-07 Certificates

Carpet; GA

Certificates of compliance from a laboratory accredited by the National Laboratory Accreditation Program of the National Institute of Standards and Technology attesting that each type of carpet and carpet with cushion material conforms to the standards specified.

#### SD-10 Operation and Maintenance Data

Carpet; GA

Cleaning and Protection; GA

Three copies of carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods, and cleaning cycles.

### 1.3 REGULATORY REQUIREMENTS

Carpet and adhesives shall bear the Carpet and Rug Institute (CRI) Indoor Air Quality (IAQ) label or demonstrate compliance with testing criteria and frequencies through independent laboratory test results. Carpet type bearing the label will indicate that the carpet has been tested and meets the criteria of the CRI IAQ Carpet Testing Program, and minimizes the impact on indoor air quality. Contractor shall procure carpet in accordance with 40 CFR 247, shall submit a report stating that the carpet contains recycled materials and indicating the actual percentage of recycled material. Contractor shall, as much as possible, select material manufacturers that reduce pollutant and waste, recycle waste, reuse resources and scrap, and reclaim flooring materials instead of disposing into a landfill. Where possible, product shall be purchased locally to reduce emissions of fossil fuels from transporting.

### 1.4 DELIVERY AND STORAGE

Materials shall be delivered to the site in the manufacturer's original wrappings and packages clearly labeled with the manufacturer's name, brand name, size, dye lot number, and related information. Materials shall be stored in a clean, dry, well ventilated area, protected from damage and soiling, and shall be maintained at a temperature above 16 degrees C for 2 days prior to installation.

### 1.5 ENVIRONMENTAL REQUIREMENTS

Areas in which carpeting is to be installed shall be maintained at a temperature above 16 degrees C for 2 days before installation, during installation, and for 2 days after installation. A minimum temperature of 13 degrees C shall be maintained thereafter for the duration of the contract. Traffic or movement of furniture or equipment in carpeted area shall not be permitted for 24 hours after installation. Other work which would damage the carpet shall be completed prior to installation of carpet.

#### 1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties including minimum ten (10) year wear warranty, two (2) year material and workmanship and ten (10) year tuft bind and delamination.

#### 1.7 EXTRA MATERIAL

Extra material from same dye lot consisting of shall be provided for future maintenance. A minimum of 10 percent of total square meters of each carpet type, pattern, and color shall be provided.

### PART 2 PRODUCTS

#### 2.1 CARPET TYPE

Carpet shall be first quality; free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains, and other physical and manufacturing defects. Carpet materials and treatments shall be reasonably nonallergenic and free of other recognized health hazards. All grade carpets shall have a static control construction which gives adequate durability and performance.

##### 2.1.1 Physical Characteristics

Carpet shall comply with the following:

- a. Recycle Efforts: 100% recycled vinyl backing. Qualifies for Leeds Certification.
- b. Carpet Construction: Tufted Loop.
- c. Type: Modular tile 500mmx500mm square with 0.15 percent growth/shrink rate in accordance with DIN 54318.]
- d. Pile Type: Level-loop.
- e. Pile Fiber: Commercial 100% branded (federally registered trademark) nylon continuous filament.
- f. Pile or Wire Height: Minimum 3.7 mm in accordance with ASTM D 418.
- g. Yarn Ply: Minimum 2 in accordance with ASTM D 1423.
  
- j. Finished Pile Yarn Weight: Minimum 38.0604 kg per square meter . This does not include weight of backings. Weight shall be determined in accordance with ASTM D 418.
- k. Pile Density: Minimum 8200.

- l. Dye Method: Solution dyed.
- m. Backing Materials: Primary backing materials shall be non woven polyester. Secondary backing shall be two layers of solid recycled thermoplastic vinyl composite material reinforced with fiberglass.

#### 2.1.2 Performance Requirements

- a. ARR (Appearance Retention Rating): Carpet shall be tested and have the minimum 3.0-3.5 (Heavy) ARR when tested in accordance with either the ASTM D 5252 (Hexapod) or ASTM D 5417 (Vettermann) test methods using the number of cycles for short and long term tests as specified.
- b. Static Control: Static control shall be provided to permanently control static buildup to less than 3.5 kV when tested at 20 percent relative humidity and 21 degrees C in accordance with AATCC TM 134.
- c. Flammability and Critical Radiant Flux Requirements: Carpet shall comply with 16 CFR 1630. Carpet in corridors and exits shall have a minimum average critical radiant flux of 0.22watts per square centimeter when tested in accordance with ASTM E 648.
- d. Tuft Bind: Tuft bind force required to pull a tuft or loop free from carpet backing shall be a minimum [40 N average force for loop pile.
- e. Colorfastness to Crocking: Dry and wet crocking shall comply with AATCC TM 165 and shall have a Class 4 minimum rating on the AATCC Color Transference Chart for all colors.
- f. Colorfastness to Light: Colorfastness to light shall comply with AATCC TM 16, Test Option E "Water-Cooled Xenon-Arc Lamp, Continuous Light" and shall have a minimum 4 grey scale rating after 40 hours.
- g. Delamination Strength: Delamination strength for tufted carpet with a secondary back shall be minimum of 440 N/m .

#### 2.2 ADHESIVES AND CONCRETE PRIMER

Release adhesive for modular tile carpet shall be as recommended by the carpet manufacturer. Adhesives flashpoint shall be minimum 60 degrees C in accordance with ASTM D 3278.

#### 2.3 COLOR, TEXTURE, AND PATTERN

Color, texture, and pattern shall be in accordance with Section 09915 COLOR SCHEDULE.

### PART 3 EXECUTION

#### 3.1 SURFACE PREPARATION

Carpet shall not be installed on surfaces that are unsuitable and will prevent a proper installation. Holes, cracks, depressions, or rough areas shall be repaired using material recommended by the carpet or adhesive manufacturer. Floor shall be free of any foreign materials and swept broom

clean. Before beginning work, subfloor shall be tested with glue and carpet to determine "open time" and bond.

### 3.2 MOISTURE AND ALKALINITY TESTS

Concrete slab shall be tested for moisture content and excessive alkalinity in accordance with CRI 104.

### 3.3 PREPARATION OF CONCRETE SUBFLOOR

Installation of the carpeting shall not commence until concrete substrate is at least 90 days old. The concrete surfaces shall be prepared in accordance with instructions of the carpet manufacturer. Type of concrete sealer, when required, shall be compatible with the carpet.

### 3.4 INSTALLATION

Installation shall be in accordance with the manufacturer's instructions and CRI 104. Edges of carpet meeting hard surface flooring shall be protected with molding. Installation shall be in accordance with the molding manufacturer's instructions.

#### 3.4.1 Modular Tile Installation

Modular tiles shall be installed with release adhesive and shall be snugly jointed together. Tiles shall be laid in the same direction with accessibility to the subfloor where required.

### 3.5 CLEANING AND PROTECTION

#### 3.5.1 Cleaning

After installation of the carpet, debris, scraps, and other foreign matter shall be removed. Soiled spots and adhesive shall be removed from the face of the carpet with appropriate spot remover. Protruding face yarn shall be cut off and removed. Carpet shall be vacuumed clean.

#### 3.5.2 Protection

The installed carpet shall be protected from soiling and damage with heavy, reinforced, nonstaining kraft paper, plywood, or hardboard sheets. Edges of kraft paper protection shall be lapped and secured to provide a continuous cover. Traffic shall be restricted for at least 45 hours. Protective covering shall be removed when directed by the Contracting Officer.

### 3.6 REMNANTS

Remnants remaining from the installation, consisting of scrap pieces more than 600 mm in dimension with more than 0.6 square meters total, shall be provided. Non-retained scraps shall be removed from site and recycled appropriately.

-- End of Section --

SECTION 09900

PAINTING, GENERAL  
07/92

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH Limit Values	(1999) Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices
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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 150	(1998a) Portland Cement
ASTM D 3273	(1994) Resistance to Growth of Mold on the Surface of Interior Coating in an Environmental Chamber
ASTM D 3274	(1995) Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation
ASTM D 4214	(1998) Evaluating Degree of Chalking of Exterior Paint Films
ASTM D 4258	(1999) Surface Cleaning Concrete for Coating

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1500	(Rev A; Notice 1) Sealer, Surface (Latex Block Filler)
CID A-A-1546	(Rev A; Canc. Notice 1)) Rubbing Varnish
CID A-A-1632	(Basic) Varnish, Asphalt
CID A-A-1788	(Canc. Notice 1)) Varnish, Oil; Interior
CID A-A-2246	(Rev B) Paint, Latex
CID A-A-2247	(Basic) Paint, Latex Epoxy (Semigloss, Interior)
CID A-A-2248	(Basic) Paint, Latex, (Flat, Interior)
CID A-A-2335	(Canc. Notice 1) Sealer, Surface (Varnish Type, Wood and Cork Floors)
CID A-A-2336	(Rev A) Primer Coating (Alkyd, Exterior Wood, White and Tints)

CID A-A-2339	(Canc. Notice 1) Stain (Wood, Solvent-Dye Type)
CID A-A-2542	Sealer, Terrazzo and Concrete Floors, Waterbased
CID A-A-2834	(Basic) Urethane, Waterborne (Low VOC, Clear)
CID A-A-2867	Coating, Polyurethane, Single Component Moisture Cure, Aliphatic
CID A-A-2962	(Rev A) Enamel, Alkyd (Metric)
CID A-A-2994	Primer Coating, Interior, for Walls and Wood

## FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1	(Rev J) Obstruction Marking and Lighting
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## FEDERAL SPECIFICATIONS (FS)

FS TT-C-542	(Rev E) Coating, Polyurethane, Oil-Free, Moisture Curing
FS TT-C-555	(Rev B; Am 1) Coating, Textured (for Interior and Exterior Masonry Surfaces)
FS TT-E-2784	(Rev A) Enamel (Acrylic-Emulsion, Exterior Gloss and Semigloss) (Metric)
FS TT-P-28	(Rev G; Notice 1) Paint, Aluminum, Heat Resisting (1200 Degrees F.)
FS TT-S-708	(Rev A; Am 2; Notice 1) Stain, Oil; Semi-Transparent, Wood, Exterior
FS TT-S-001992	(Basic; Notice 1) Stain, Latex, Exterior for Wood Surfaces

## MAPLE FLOORING MANUFACTURERS ASSOCIATION (MFMA)

MFMA-03	(1997) Floor Sealer and Finish List and Specifications for Heavy Duty and Gymnasium Sealers and Finishes for Maple, Beech and Birch Floors: MFMA Floor Finish List Number 16
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## THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 5	(1995) Zinc Dust, Zinc Oxide and Phenolic Varnish Paint
SSPC Paint 18	(1991) Chlorinated Rubber Intermediate Coat Paint
SSPC Paint 20	(1991) Zinc-Rich Primers (Type I - "Inorganic" and Type II - "Organic")
SSPC Paint 23	(1991) Latex Primer for Steel surfaces

SSPC Paint 25	(1991) Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer (Without Lead and Chromate Pigments)
SSPC SP 1	(1982) Solvent Cleaning
SSPC SP 2	(1995) Hand Tool Cleaning
SSPC SP 3	(1995) Power Tool Cleaning
SSPC SP 6/NACE 3	(1994) Commercial Blast Cleaning
SSPC SP 7/NACE 4	(1994) Brush-Off Blast Cleaning

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

### SD-03 Product Data

Paint; GA

The names, quantity represented, and intended use for the proprietary brands of materials proposed to be substituted for the specified materials [when the required quantity of a particular batch is 200 L or less.] [regardless of quantities in states where VOC content limitations apply.]

Mixing and Thinning; GA  
Application; GA

Manufacturer's current printed product description, material safety data sheets (MSDS) and technical data sheets for each coating system. Detailed mixing, thinning and application instructions, minimum and maximum application temperature, and curing and drying times between coats for epoxy, moisture-curing polyurethane, and liquid glaze coatings. Detailed application instructions for textured coatings shall be provided.

### SD-04 Samples

Moisture-Curing Polyurethane; GA

A complete moisture-curing polyurethane system applied to a panel of the same material as that on which the coating will be applied in the work and for each color specified. The sample panels will be used for quality control in applying the system.

Paint; GA

While the material is at the site or source of supply, and at a time agreeable to the Contractor and the Contracting Officer, a 1 liter sample of each color and batch, except for quantities of 200 liters or less, shall be taken by random selection from the sealed containers by the Contractor in the presence of a representative of the Contracting Officer. The contents of the containers to be sampled shall be thoroughly mixed to ensure that the sample is representative. Samples shall be identified by designated name, specification number, manufacturer name and

address, batch number, project contract number, intended use, and quantity involved.

#### SD-06 Test Reports

Paint; GA

A statement as to the quantity represented and the intended use, plus the following test report for batches in excess of 200 L:

a. A test report showing that the proposed batch to be used meets specified requirements:

b. A test report showing that a previous batch of the same formulation as the batch to be used met specified requirements, plus, on the proposed batch to be used, a report of test results for properties of weight per liter, viscosity, fineness of grind, drying time, color, and gloss.

#### SD-07 Certificates

Lead; GA

Mildewcide and Insecticide; GA

Volatile Organic Compound (VOC) Content; GA

Certificate stating that paints for interior use contain no mercurial mildewcide or insecticide. Certificate stating that paints proposed for use contain not more than 0.06 percent lead by weight of the total nonvolatile. Certificate stating that paints proposed for use meet Federal VOC regulations and those of the of the local Air Pollution Control Districts having jurisdiction over the geographical area in which the project is located.

### 1.3 PACKAGING, LABELING, AND STORING

Paints shall be in sealed containers that legibly show the designated name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer. Pigmented paints shall be furnished in containers not larger than 20 liters.

Paints and thinner shall be stored in accordance with the manufacturer's written directions and as a minimum stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors and at temperatures between 4 and 35 degrees C. Paints shall be stored on the project site or segregated at the source of supply sufficiently in advance of need to allow 30 days for testing.

### 1.4 APPROVAL OF MATERIALS

When samples are tested, approval of materials will be based on tests of the samples; otherwise, materials will be approved based on test reports furnished with them. If materials are approved based on test reports furnished, samples will be retained by the Government for testing should the materials appear defective during or after application. In addition to any other remedies under the contract the cost of retesting defective materials will be at the Contractor's expense.

### 1.5 ENVIRONMENTAL CONDITIONS

Unless otherwise recommended by the paint manufacturer, the ambient temperature shall be between 7 and 35 degrees C when applying coatings other than water-thinned, epoxy, and moisture-curing polyurethane coatings.

Water-thinned coatings shall be applied only when ambient temperature is

between 10 and 32 degrees C. Epoxy, and moisture-curing polyurethane coatings shall be applied only within the minimum and maximum temperatures recommended by the coating manufacturer. Moisture-curing polyurethane shall not be applied when the relative humidity is below 30 percent.

## 1.6 SAFETY AND HEALTH

Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis as specified in the CONTRACT CLAUSES. The Activity Hazard Analysis shall include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.

### 1.6.1 Worker Exposures

Exposure of workers to hazardous chemical substances shall not exceed limits established by ACGIH Limit Values, or as required by a more stringent applicable regulation.

### 1.6.2 Toxic Compounds

Toxic products having ineffective physiological warning properties, such as no or low odor or irritation levels, shall not be used unless approved by the Contracting Officer.

### 1.6.3 Training

Workers having access to an affected work area shall be informed of the contents of the applicable material data safety sheets (MDSS) and shall be informed of potential health and safety hazard and protective controls associated with materials used on the project. An affected work area is one which may receive mists and odors from the painting operations. Workers involved in preparation, painting and clean-up shall be trained in the safe handling and application, and the exposure limit, for each material which the worker will use in the project. Personnel having a need to use respirators and masks shall be instructed in the use and maintenance of such equipment.

### 1.6.4 Coordination

Work shall be coordinated to minimize exposure of building occupants, other Contractor personnel, and visitors to mists and odors from preparation, painting and clean-up operations.

## PART 2 PRODUCTS

### 2.1 PAINT

The term "paint" as used herein includes emulsions, enamels, paints, stains, varnishes, sealers, cement-emulsion filler, and other coatings, whether used as prime, intermediate, or finish coat. Paint shall conform to the requirements listed in the painting schedules at the end of this section, except when the required amount of a material of a particular batch is 200 liters or less, an approved first-line proprietary paint material with similar intended formulation, usage and color to that specified may be used. The proprietary paint material shall be of the same type, color, and be equivalent in performance of the type specified in the painting schedules. Equivalent performance shall be within 10 percent of the values for the percent of pigment, the percent of solid content (percent of pigment by weight and the percent of nonvolatile vehicle by weight), the viscosity (K.U.'s), the gloss and the drying times for set-to-touch, recoating, and dry hard.

### 2.1.1 Colors and Tints

Colors shall be as selected from manufacturer's standard colors, as indicated. Manufacturer's standard color is for identification of color only. Tinting of epoxy and urethane paints shall be done by the manufacturer. Stains shall conform in shade to manufacturer's standard color. The color of the undercoats shall vary slightly from the color of the next coat.

### 2.1.2 Mildewcide and Insecticide

Paint specified for all coats applied to fabrics and vapor barrier jackets over insulation and surfaces in non-air conditioned area shall contain a mildewcide that will not adversely affect the color, texture, or durability of the coating. The mildewcide shall be incorporated into the paint by the manufacturer and shall attain a surface disfigurement rating of 8 or greater when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274. Mercurial mildewcide shall not be used in interior paint. Insecticides shall not be used in paint.

### 2.1.3 Lead

Paints containing lead in excess of 0.06 percent by weight of the total nonvolatile content (calculated as lead metal) shall not be used.

### 2.1.4 Chromium

Paints containing zinc chromate or strontium chromate pigments shall not be used.

### 2.1.5 Volatile Organic Compound (VOC) Content

Paints shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards and shall conform to the restrictions of the local air pollution control authority.

## PART 3 EXECUTION

### 3.1 PROTECTION OF AREAS NOT TO BE PAINTED

Items not to be painted which are in contact with or adjacent to painted surfaces shall be removed or protected prior to surface preparation and painting operations. Items removed prior to painting shall be replaced when painting is completed. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Surfaces contaminated by coating materials shall be restored to original condition.

### 3.2 SURFACE PREPARATION

Surfaces to be painted shall be clean and free of foreign matter before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

#### 3.2.1 Concrete, Stucco and Masonry Surfaces

Concrete, stucco and masonry surfaces shall be allowed to dry at least 30 days before painting, except concrete slab on grade which shall be allowed

to cure 90 days before painting. Surfaces shall be cleaned in accordance with ASTM D 4258. Glaze, efflorescence, laitance, dirt, grease, oil, asphalt, surface deposits of free iron and other foreign matter shall be removed prior to painting. Surfaces to receive polyurethane or epoxy coatings shall be acid-etched or mechanically abraded as specified by the coating manufacturer, rinsed with water, allowed to dry, and treated with the manufacturer's recommended conditioner prior to application of the first coat.

### 3.2.2 Ferrous Surfaces

Ferrous surfaces including those that have been shop-coated, shall be solvent-cleaned or detergent-washed in accordance with SSPC SP 1. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be cleaned mechanically with hand tools according to SSPC SP 2, power tools according to SSPC SP 3 or by sandblasting according to SSPC SP 7/NACE 4. Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

### 3.2.3 Nonferrous Metallic Surfaces

Galvanized, aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces shall be solvent-cleaned or detergent-washed in accordance with SSPC SP 1.

### 3.2.4 Gypsum Board Surfaces

Gypsum board surfaces shall be dry and shall have all loose dirt and dust removed by brushing with a soft brush, rubbing with a cloth, or vacuum-cleaning prior to application of the first-coat material. A damp cloth or sponge may be used if paint will be water-based.

### 3.2.5 Mastic-Type Surfaces

Mastic-type surfaces shall be prepared by removing foreign material.

### 3.2.6 Wood Surfaces

Wood surfaces shall be cleaned of foreign matter. Moisture content of the wood shall not exceed 12 percent as measured by a moisture meter, unless otherwise authorized. Wood surfaces adjacent to surfaces to receive water-thinned paints shall be primed and/or touched up before applying water-thinned paints. Small, dry seasoned knots shall be scraped, cleaned, and given a thin coat of commercial knot sealer, before application of the priming coat. Pitch on large, open, unseasoned knots and all other beads or streaks of pitch shall be scraped off, or, if it is still soft, removed with mineral spirits or turpentine, and the resinous area shall be thinly coated with knot sealer. Finishing nails shall be set, and all holes and surface imperfections shall be primed. After priming, holes and imperfections in finish surfaces shall be filled with putty or plastic wood filler, colored to match the finish coat if natural finish is required, allowed to dry, and sanded smooth. Putty or wood filler shall be compatible with subsequent coatings.

## 3.3 APPLICATION

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application. Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges,

waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces. Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch.

### 3.3.1 Ventilation

Affected areas shall be ventilated during paint application so that workers exposure to chemical substances shall not exceed limits as established by ACGIH Limit Values, or as required by a more stringent applicable regulation. Interior work zones having a volume of 280 cubic meters or less shall be ventilated at a minimum of 2 air exchanges per hour. Ventilation in larger work zones shall be maintained by means of mechanical exhaust. Solvent vapors shall be exhausted outdoors, away from air intakes and workers. Return air inlets in the work zone shall be temporarily sealed before start of work until the coatings have dried.

### 3.3.2 Respirators

Operators and personnel in the vicinity of operating paint sprayers shall wear respirators.

### 3.3.3 First Coat

The first coat on plaster, gypsum wallboard, and other surfaces shall include repeated touching up of suction spots or overall application of primer or sealer to produce uniform color and gloss. Excess sealer shall be wiped off after each application. The first coat on both faces of wood doors shall be applied at essentially the same time. Glazed doors and sashes shall be given the specified coating system within 3 weeks of the time they are glazed, but not before the glazing material has set; paint shall overlay glass about 1.78 mm all around. Each varnish coat shall be sanded lightly prior to application of subsequent coats.

### 3.3.4 Timing

Surfaces that have been cleaned, pretreated, and otherwise prepared for painting shall be given a coat of the specified first coat as soon as practical after such pretreatment has been completed, but prior to any deterioration of the prepared surface. Sufficient time shall elapse between successive coats to permit proper drying. This period shall be modified as necessary to suit weather conditions. Oil-based or oleoresinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause the undercoat to lift or lose adhesion. Manufacturer's instructions for application, curing and drying time between coats of two-component systems shall be followed.

### 3.3.5 Fillers

Concrete and masonry surface voids shall be filled; however, surface irregularities need not be completely filled. The dried filler shall be uniform and free of pinholes. Filler shall not be applied over caulking compound.

#### 3.3.5.1 Cement-Emulsion Filler

Immediately before filler application, surfaces shall be dampened uniformly

and thoroughly, with no free surface water visible, by several applications of potable water with a fog spray, allowing time between the sprayings for water to be absorbed. Cement-emulsion filler shall be scrubbed into the surface vigorously with a stiff-bristled brush having tampico or palmyra bristles not longer than 63 mm. At least 24 hours shall elapse before applying exterior emulsion paint over cement-emulsion filler. When the ambient temperature is over 29 degrees C, cement-emulsion filler surfaces shall be dampened lightly with a fog spray of potable water immediately prior to application of the subsequent paint coat.

#### 3.3.5.2 Latex Filler

Latex filler, CID A-A-1500, shall be applied according to the manufacturer's instructions. Surface voids shall be filled. The filler shall be allowed to dry the length of time specified by the manufacturer prior to applying successive coats of paint. Two coats may be necessary to cover.

#### 3.3.6 Textured Coating

Application of textured coating, FS TT-C-555, shall be as specified in the manufacturer's printed directions at a rate of 45-55 square feet per gallon..

#### 3.3.7 Ferrous-Metal Primer

Primer for ferrous-metal shall be applied to ferrous surfaces to receive paint other than asphalt varnish prior to deterioration of the prepared surface. The semitransparent film applied to some pipes and tubing at the mill is not to be considered a shop coat, but shall be overcoated with the specified ferrous-metal primer prior to application of finish coats.

### 3.4 PIPE COLOR CODE MARKING

Pipes in exposed areas and in accessible pipe spaces shall be provided with color band and titles adjacent to all valves, except those provided at plumbing fixtures, at not more than 12 meter spacing on straight pipe runs, adjacent to change in direction, and on both sides where pipes pass through walls or floors. Color code marking shall be of the color listed in TABLE I and the size listed in TABLE II. The arrows shall be installed adjacent to each band to indicate the direction of flow in the pipe. The legends shall be printed in upper-case black letters as listed in TABLE I. Letter sizes shall be as listed in TABLE II. Marking shall be painted or applied using colored, pressure-sensitive adhesive markers of standard manufacture. Paint shall be as specified for insulated and uninsulated piping.

Uninsulated pipes in the mechanical rooms shall be painted and labeled. Pipe paint color shall be the color indicated on the "Band" column of Table I. Pipe labels and arrows shall be as indicated in Table I. Uninsulated stainless steel and plastic piping shall not be painted, but shall be color coded in accordance with Table I. Insulated pipe with PVC insulation jacket cover need not be painted, but shall be color coded in accordance with Table I.

Concrete equipment pads in the mechanical rooms shall be touched-up as necessary, after equipment installation. color of the equipment pad shall be grey.

TABLE I. COLOR CODES FOR MARKING PIPE

Material	Band	Letters and Arrow*	Legend
Cold water (potable)	Green	White	POTABLE WATER
Fire protection water	Red	White	FIRE PR. WATER
Fire Sprinkler Water	Red	White	FIRE SPR. WATER
Hot water (domestic)	Green	White	H.W.
Hot water recirculating (domestic)	Green	White	H.W.R.
High temp. water supply	Yellow	Black	H.T.W.S.
High temp. water return	Yellow	Black	H.T.W.R.
Boiler feed water	Yellow	Black	B.F.
Low temp. water supply (heating)	Yellow	Black	L.T.W.S.
Low temp. water return (heating)	Yellow	Black	L.T.W.R.
Condenser water supply	Green	White	COND. W.S.
Condenser water return	Green	White	COND. W.R.
Chilled water supply	Green	White	C.H.W.S.
Chilled water return	Green	White	C.H.W.R.
Treated water	Green	White	TR. WATER
Chemical feed	Yellow	Black	CH. FEED
Compressed air	Blue	White	COMP. AIR
Natural gas	Yellow	Black	NAT. GAS
Propane Gas	Yellow	Black	PROP. GAS
Refrigerants	Blue	White	REFRIGERANT
Fuel oil	Yellow	Black	FUEL OIL
Steam	Yellow	Black	STEAM
Condensate	Yellow	Black	CONDENSATE
Hydraulic fluid under 4.1 MPa	Green	White	HYDRAULIC FLUID-_____PSI
Hydraulic fluid 4.1 MPa and Greater	Yellow	Black	HYDRAULIC FLUID-_____PSI

TABLE II. COLOR CODE MARKING SIZES

Outside Diameter of Pipe Covering (mm)	Width of Color Band (mm)	Arrow Length x Width (mm)	Size of Legend Letters and Numerals (mm)
Less than 38	200	200 x 57	13
38 to 60	200	200 x 57	19
60 to 150	300	200 x 57	31
200 to 225	600	300 x 110	63
Over 250	800	300 x 115	88

### 3.5 MISCELLANEOUS PAINTING

#### 3.5.1 Lettering

Lettering shall be provided as scheduled on the drawings, shall be block type, and shall be black enamel. Samples shall be approved before application.

#### 3.6 SURFACES TO BE PAINTED

Surfaces listed in the painting schedules at the end of this section, other

than those listed in paragraph SURFACES NOT TO BE PAINTED, shall be painted as scheduled.

### 3.7 SURFACES NOT TO BE PAINTED

Surfaces in the following areas shall not to be painted:

- a) Exterior Poured Concrete
- b) Concrete Floors
- c) Exterior and Interior aluminum
- d) Aluminum or galvanized roofing
- e) Exterior caulking and sealants
- f) Door and window hardware unless specifically specified to be painted in Section 08700 - BUILDERS HARDWARE
- g) Sprinkler heads and other fire detection elements
- h) Safety nosings
- i) Interior and Exterior signs
- j) Walls and ceilings in crawl spaces
- k) Aluminum or sized vapor barrier jacketing over insulated pipes in unexposed locations that do not require color coding

### 3.8 CLEANING

Cloths, cotton waste and other debris that might constitute a fire hazard shall be placed in closed metal containers and removed at the end of each day. Upon completion of the work, staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint and other deposits on adjacent surfaces shall be removed and the entire job left clean and acceptable.

### 3.9 PAINTING SCHEDULES

The following painting schedules identify the surfaces to be painted and prescribe the paint to be used and the number of coats of paint to be applied. Contractor options are indicated by -----or----- between optional systems or coats.

#### EXTERIOR PAINTING SCHEDULE

<u>Surface</u>	<u>First Coat</u>	<u>Second Coat</u>	<u>Third Coat</u>
Concrete masonry units.	Cement-emulsion filler	FS TT-E-2784 Type III	None
	CID A-A-1500	FS TT-E-2784 Type III	None
	FS TT-E-2784 Type III	FS TT-E-2784 Type III	None

NOTE: Cement-emulsion filler coat shall be acrylic-based and shall consist of the following ingredients in the proportion stated: white portland cement, ASTM C 150, Type I, 7.5 kg; aggregate 15 kg; mixing liquid, factory-prepared acrylic containing 46 to 47 percent solids, 3 liters; potable water 4 liters maximum; exterior emulsion paint, FS TT-E-2784 Type III 4 liters. Aggregate shall consist of Washed silica sand of the following gradation:

<u>U.S. Sieve Size</u>	<u>Percent Sand (by Weight) Passing Individual Sieve</u>
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## EXTERIOR PAINTING SCHEDULE

<u>Surface</u>	<u>First Coat</u>	<u>Second Coat</u>	<u>Third Coat</u>
	0.850 mm (20)	100	
	0.600 mm (30)	95 - 100	
	0.300 mm (50)	30 - 65	
	0.150 mm (100)	0 - 10	
	0.075 mm (200)	0 - 1	
<hr/>			
Ferrous metal unless otherwise specified	SSPC Paint 25	CID A-A-2962 Type I Class A Grade C	CID A-A-2962 Type 1 Class A Grade C
<hr/>			
Galvanized metal.	FS TT-E-2784 Type III	FS TT-E-2784 Type III	FS TT-E-2784 Type III
<hr/>			
Aluminum aluminum-alloy, and other non- ferrous metal (non-galvanized)	FS TT-E-2784 Type III	FS TT-E-2784 Type II	FS TT-E-2784 Type II
<hr/>			

## INTERIOR PAINTING SCHEDULE

<u>Surface</u>	<u>First Coat</u>	<u>Second Coat</u>	<u>Third Coat</u>
Concrete masonry units requiring a smooth finish	CID A-A-1500	CID A-A-2994 Type II	CID A-A-2247
Ferrous Metal unless otherwise specified	SSPC Paint 25	CID A-A-2962 Type I  Grade C	CID A-A-2962 Type I  Grade C
Ferrous metal in concealed damp spaces or in exposed areas having unpainted adjacent surfaces as follows: non- air conditioned areas	CID A-A-1632	None	None
Ferrous metal factory-primed mechanical and electrical equipment.	Two coats of paint as recommended by the equipment manufacturer		None
Galvanized metal:	SSPC Paint 5	CID A-A-2962 Type I  Grade C	CID A-A-2962 Type I  Grade C

-- End of Section --

SECTION 09915

COLOR SCHEDULE  
06/93  
AMENDMENT 00001

PART 1 GENERAL

1.1 GENERAL

This section covers only the color of the exterior and interior materials and products that are exposed to view in the finished construction. The word "color" as used herein includes surface color and pattern. Requirements for quality and method of installation are covered in other appropriate sections of the specifications. Specific locations where the various materials are required are shown on the drawings. Items not designated for color in this section may be specified in other sections. When color is not designated for items, the Contractor shall propose a color for approval.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Samples

Color Schedule; G

AM 1 Three sets of color boards, 120 days after the Contractor is given Notice to proceed, complying with the following requirements:

- a. Color boards shall reflect all actual finish textures, patterns, and colors required for this contract.
- b. Materials shall be labeled with the finish type, manufacturer's name, pattern, and color reference.
- c. Samples shall be on size A4 or 8-1/2 by 11 inch boards with a maximum spread of size A1 or 25-1/2 by 33 inches for foldouts.
- d. Samples for this color board are required in addition to samples requested in other specification sections.
- e. Color boards shall be submitted for approval to:  
ARCHITECTUAL SECTION  
DESIGN BRANCH  
FORT WORTH DISTRICT

PART 2 PRODUCTS

2.1 REFERENCE TO MANUFACTURER'S COLOR

Where color is shown as being specific to one manufacturer, an equivalent color by another manufacturer may be submitted for approval. Manufacturers

and materials specified are not intended to limit the selection of equal colors from other manufacturers.

## 2.2 COLOR SCHEDULE

The color schedule lists the colors, patterns and textures required for exterior and interior finishes, including both factory applied and field applied colors.

### 2.2.1 Exterior Walls

Exterior wall colors shall apply to exterior wall surfaces including recesses at entrances and projecting vestibules. Conduit shall be painted to closely match the adjacent surface color. Wall color shall be provided to match the colors listed below.

- a. Brick: INTERSTATE:
  - BR-1; CANYON ROSE
  - BR-2; PLATINUM
  - BR-3; PARK ROSE

- b. Mortar: GRAY

#### AM 1

- c. Paint: SHERWIN WILLIAMS, SUMMIT GRAY SW2127.

#### AM 1

- d. Split-Face Concrete Masonry Units (Integrally Colored):  
FEATHERLITE; SADDLETAN 707

#### AM 1

- e. Metal Wall Panels, Hardware, and Associated Trim: TO MATCH GRAHAM ARCH. PRODUCTS, SAHARA SAND.

### 2.2.2 Exterior Trim

Exterior trim shall be provided to match the colors listed below.

- a. Doors and Door Frames: TO MATCH GRAHAM ARCHITECTURAL PRODUCTS; SAHARA SAND  
Roll-up Doors: TO MATCH GRAHAM ARCHITECTURAL PRODUCTS: SAHARA SAND
- b. Windows (mullion, muntin, sash, trim, and sill): TO MATCH GRAHAM ARCHITECTURAL PRODUCTS; SAHARA SAND
- d. Fascia: MBCI; COLONIAL RED
- e. Downspouts, Gutter, Louvers, and Flashings: MBCI; COLONIAL RED
- g. Soffits and Ceilings: TO MATCH STANDING SEAM METAL ROOF, MBCI, COLONIAL RED
- j. Caulking and Sealants: COLOR TO BE SELECTED FROM MANUFACTURER'S STANDARD COLORS TO MATCH ADJACENT WALL SURFACES.

### 2.2.3 Exterior Roof

Roof color shall apply to exterior roof surfaces including sheet metal flashings and copings, mechanical units, roof trim, pipes, conduits, electrical appurtenances, and similar items. Roof color shall be provided to match the colors listed below.

- a. Metal: MBCI; COLONIAL RED

#### 2.2.4 Interior Floor Finishes

Flooring materials shall be provided to match the colors listed below.

- b. Carpet Tile:  
CPT-1; INTERFACE, CIRCUIT BOARD, 3276 MONITOR WITH GLASBAC RECYLED TILE BACK
- c. Vinyl Composition Tile:  
VCT; TARKETT, EXPRESSIONS, #2037 BISQUE SHELL BROWN
- h. Ceramic Tile:  
CTF-1; DAL-TILE, KEYSTONES, SPICE 50X50mm  
  
\*NOTE: TO BE INSTALLED AT A 45 DEGREE ANGLE  
**AM 1 GROUT; MAPEI, GRAY 09 - GROUT TO BE SEALED**
- i. Porcelain Tile:  
PTF-1; DAL-TILE, LANDSCAPE, TEBE LS04 TEXTURED, 300 X 300mm  
PTF-2; DAL-TILE, LANDSCAPE, TEBE LS04 UNPOLISHED, 300 x 300mm  
  
NOTE: TO BE INSTALLED AT A 45 DEGREE ANGLE  
**AM 1 GROUT RELEASE TO BE APPLIED PRIOR TO GROUTING**
- j. Grout: MAPEI, GRAY **AM 1 09**  
  
NOTE: GROUT TO BE SEALED

#### 2.2.5 Interior Base Finishes

Base materials shall be provided to match the colors listed below.

- a. Resilient Base and Edge Strips:  
RB-1; JOHNSONITE, TIGHTLOCK, TBC-65 CORONADO  
RB-2; JOHNSONITE, 127 VANILLA
- c. Ceramic Tile:  
CTB-1; DAL-TILE, MB-5A, SPICE
- d. Porcelain Tile:  
PTB-1; DAL-TILE, LANDSCAPE, TEBE LS04, UNPOLISHED  
  
**AM 1 GROUT RELEASE TO BE APPLIED PRIOR TO GROUTING**
- e. Grout: MAPEI; GRAY 09

NOTE: GROUT TO BE SEALED

## 2.2.6 Interior Wall Finishes

Interior wall color shall apply to the entire wall surface, including reveals, vertical furred spaces, grilles, diffusers, electrical and access panels, and piping and conduit adjacent to wall surfaces unless otherwise specified. Items not specified in other paragraphs shall be painted to match adjacent wall surface. Wall materials shall be provided to match the colors listed below.

- a. Paint:
  - P-1; SHERWIN WILLIAMS, ONLY NATURAL 1088
- b. Vinyl Wall Covering:
  - WC-1; VICRTEX, MILANO, TORINO TAUPE ML21-36
  - WC-2; KENMARK; WALLTALKERS, ERASE-RITE, MATTE-WHITE, ML21-30

NOTE: WC-2, SEE ARCH DRWG. I1.01. CONTRACTOR TO FIELD MEASURE.

- c. **AM 1 PTW-1:**
  - PTW-1; DAL-TILE, LANDSCAPE, TEBE LS04, UNPOLISHED, 300 X 300mm**

**NOTE: A GROUT RELEASE TO BE APPLIED PRIOR TO GROUTING.**  
**GROUT; MAPEI, GRAY 09**

- d. Ceramic Tile:
  - CTW-1; DAL-TILE, KEYSTONES, SPICE
  - AM 1 CTW-2; DAL-TILE, PERMABRITES, GLOSS SABLE 6421, 50 X 50mm**
- e. Ceramic **AM 1 AND PORCELAIN** Tile Grout: MAPEI, **AM 109**  
**AM 1 GROUT TO BE SEALED**  
**GROUT; MAPEI, GRAY 09**
- f. Acoustical Wall Covering:
  - AWC-1; PANEL SOLUTIONS, TRIMLINE
  - FABRIC; GUILFORD OF MAIN, 380 QUARTZ

NOTE: SEE ARCH DRWG. I1.01 FOR PLACEMENT

## 2.2.7 Interior Ceiling Finishes

Ceiling colors shall apply to ceiling surfaces including soffits, furred down areas, grilles, diffusers, registers, and access panels. Ceiling color shall also apply to joist, underside of roof deck, and conduit and piping where joists and deck are exposed and required to be painted. Ceiling materials shall be provided to match the colors listed below.

- a. Acoustical Tile and Grid:
  - ATC; ARMSTRONG, ULTIMA, WHITE
- b. Paint:
  - P-1; SHERWIN WILLIAMS, ONLY NATURAL 1088

#### 2.2.8 Interior Trim

Interior trim shall be provided to match the colors listed below.

- a. Doors: AM 1  
P-1; SHERWIN WILLIAMS, ONLY NATURAL 1088  
METAL; DARK BRONZE
- b. Door Frames:  
P-1; SHERWIN WILLIAMS, ONLY NATURAL 1088  
METAL; DARK BRONZE
- c. Windows (mullion, muntin, sash, trim, and stool):  
P-1; SHERWIN WILLIAMS, ONLY NATURAL 1088
- d. Window Sills:  
P-1; SHERWIN WILLIAMS, ONLY NATURAL 1088
- e. Fire Extinguisher Cabinets: STAINLESS STEEL

#### 2.2.9 Interior Window Treatment

Window treatments shall be provided to match the colors listed below.

- a. WINDOW SHADES: MECO; EUROVEIL, 5304

#### 2.2.10 Interior Miscellaneous

Miscellaneous items shall be provided to match the colors listed below.

- a. Toilet Partitions and Urinal Screen: SANTANA, BLACK
- b. Plastic Laminate:  
RECEPTION COUNTER AND PASS THRU WINDOW  
PL-1; WILSONART; BLACK 1595-60 AM 1 FRONTS  
PL-2; WILSONART; BLACKSTAR GRANITE, 4551-60 AM 1 COUNTERTOP  
NOTE; SEE ARCH DRWG. A1.02 & I1.02 FOR PLACEMENT  
  
KITCHEN AREA  
PL-3; WILSONART; AM1 FIELDSTONE, 4792-60, COUNTERTOP  
PL-4; WILSONART; AM 1 ALUMA STEEL 6277-419, CABINETS  
NOTE; SEE ARCH DRWG. I1.02 FOR PLACEMENT  
  
SHELVING  
PL-5; WILSONART; AM 1 KHAKI BROWN D50-60
- c. Signage Message Color (excluding handicapped signage): BASE STANDARD
- d. Signage Background Color (excluding handicapped signage): BASE STANDARD
- e. Lockers: BLACK
- f. Operable Partitions: KWIK-WALL, STEEL PANEL 3000 SERIES  
FABRIC; MAHARAM, TEK-WALL 1000, BISCUIT BEIGE

- g. Corner Guards: CLEAR ARYCLIC
- h. Wall Switch Handles and Standard Receptacle Bodies: IVORY
- i. Electrical Device Cover Plates and Panels: IVORY
- j. Casework:  
 RECEPTION COUNTER AND PASS THRU WINDOW  
 FRONT/SIDES; PL-1, WILSONART; BLACK 1595-60 AM 1 FRONTS  
 COUNTERTOP; PL-2, WILSONART; BLACKSTR GRANITE4551-60 AM 1  
COUNTERTOP
- KITCHEN AREA  
 COUNTER; PL-3, WILSONART, AM 1 FIELDSTONE, 4192-60, COUNTERTOP  
 FRONTS; PL-4, WILSONART, AM 1 ALUMASTEEL 6277-419 CABINET
- NOTE: SEE ARCH DRWGS A1.02 AND/OR I1.02 FOR PLACMENT
- SHELVING  
 PL-5; WILSONART, KHAKI BROWN D50-60
- k. Shower Curtain: BEIGE  
**AM 1**
1. **THEATRE CHAIRS**  
**SITMATIC; BLACK**

## 2.2.11 ROOM COLOR AND FINISH SCHEDULE

## ADMIN FACILITY

Area:	Mechanical A101						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	None	Conc	P-1	P-1	P-1	P-1	Exposed P-1
Area:	Communications A102						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	None	Conc	P-1	P-1	P-1	P-1	P-1
Area:	Electrical A103						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	None	Conc	P-1	P-1	P-1	P-1	P-1
Area:	Vending Area A104						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	PTB-1	PTF-1	WC-1	WC-1		WC-1	P-1

NOTE; FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area:	Lobby 2 A105						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	PTB-1	PTF-1	-	P-1	P-1	WC-1	P-1

NOTE; FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area:	Corridor A106A						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	RB-1	<b>AM1 CPT-1</b>	P-1	-	P-1	P-1	ATC
Area:	Corridor A106B						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	RB-1	<b>AM1 CPT-1</b>	P-1	-	P-1	-	ATC

## Area: Women's Latrine A107

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
PTB-1	PTF-2	PTW-1	PTW-1	PTW-1	PT2-1	P-1
		CTW-2	CTW-2	CTW-2	CTW-2	

NOTE: SEE ARCH. DRWGS. I1.02 FOR PATTERN  
FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

## Area: Men's Latrine A108

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
PTB-1	PTF-1	PTW-1	PTW-1	PTW-1	PT2-1	P-1
		CTW-2	CTW-2	CTW-2	CTW-2	

NOTE: SEE ARCH. DRWGS. I1.02 FOR PATTERN  
FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

## Area: Corridor A109

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
RB-1	<b>AM1 CPT-1</b>	P-1	P-1	-	P-1	P-1

## Area: Janitor A110

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
NONE	CONC	P-1	P-1	P-1	P-1	P-1

## Area: Mechancial A111

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
None	Conc	P-1	P-1	P-1	P-1	Exposed <b><u>AM 1 P-1</u></b>

## Area: Break A112

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
PTB-1	PTF-1	WC-1	WC-1	WC-1	WC-1	ACT

NOTE; FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

## Area: Corridor A113

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
PTB-1	PTF-1	WC-1	WC-1	-	WC-1	P-1

NOTE; FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

## Area: Documents A114

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
RB-1	<b><u>AM1 CPT-1</u></b>	P-1	P-1	P-1	P-1	ATC

## Area: Closet A115

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
RB-2	<b><u>AM1 VCT-1</u></b>	P-1	P-1	P-1	P-1	P-1

NOTE: ALL SHELVING SURFACES W/ PLASTIC LAMINATE SHALL BE PL-5  
ALL PAINTED SHELVING SHALL BE P-1

## Area: Storage A116

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
RB-2	<b><u>AM1 VCT-1</u></b>	P-1	P-1	P-1	P-1	P-1

OTE: ALL SHELVING SURFACES W/ PLASTIC LAMINATE SHALL BE PL-5  
ALL PAINTED SHELVING SHALL BE P-1

## Area: Corridor A117

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
PTB-1	PTF-1	WC-1	WC-1	WC-1	WC-1	ATC

NOTE; FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: Reception A118  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 PTB-1 PTF-1 WC-1 WC-1 WC-1 WC-1 ATC

NOTE; FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: TCACCIS A119  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 RB-1 AM1 CPT-1 P-1 P-1 P-1 P-1 ATC

Area: Lobby 1 A120  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 PTB-1 PTF-1 AM1 P-1 P-1 P-1 P-1 P-1

NOTE; FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: Office A121  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 RB-1 AM1 CPT-1 P-1 P-1 P-1 P-1 ATC

Area: Corridor A122A  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 RB-1 AM1 CPT-1 P-1 P-1 WC-1 P-1 P-1

AM 1 NOTE: WC-1 TO BE INSTALLED ON CURVED WALL ONLY

Area: Corridor A122B  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 RB-1 AM1 CPT-1 WC-1 P-1 P-1 P-1

AM 1 NOTE: WC-1 TO BE INSTALLED ON CURVED WALL ONLY

Area: Corridor A122C  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 RB-1 AM1 CPT-1 P-1 P-1 P-1 WC-1 P-1

AM 1 NOTE: WC-1 TO BE INSTALLED ON CURVED WALL ONLY

Area: Office A123  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 RB-1 AM1 CPT-1 P-1 P-1 P-1 P-1 ATC

Area: Classroom A124  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 RB-1 AM1 CPT-1 WC-2 PART. P-1 WC-2 ATC  
 AWC-1 AWC-1

NOTE; SEE ARCH. DRWG I1.02 FOR WALLCOVERING PLACEMENT

Area: Classroom A125  
 Base Floor A Wall B Wall C Wall D Wall Ceiling  
 RB-1 AM1 CPT-1 WC-2 WC-2 P-1 PART. ATC  
 AWC-1 AWC-1

NOTE; SEE ARCH. DRWG I1.02 FOR WALLCOVERING PLACEMENT

#### ENGINE SHOP

Area: Office E101  
 Base Floor A Wall B Wall C Wall D Wall Ceiling

NOTE; VCT TO BE INSTALLED AT A 45 DEGREEE ANGLE

Area:	Men's El04						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	CTB-1	CTF-1	CTW-1	CTW-1	CTW-1	CT2-1	P-1
			CTW-2	CTW-2	CTW-2	CT2-2	

Area:	Women's	E105					
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	CTB-1	CTF-1	CTW-1	CTW-1	CTW-1	CT2-1	P-1
			CTW-2	CTW-2	CTW-2	CTW-W	

AM 1

Area:	Mechanical E107						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	None	Conc	P-1	P-1	P-1	P-1	Exposed
							<b>AM 1 P-1</b>

Area:	Electrical E109						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	None	Conc	P-1	P-1	P-1	P-1	Exposed
							<b>AM 1 P-1</b>

Area:	Solvent Wash E110						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	None	Conc	P-1	P-1	P-1	P-1	Exposed
							AM 1 P-1

Area:	Oil Storage El111						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	None	Conc	P-1	P-1	P-1	P-1	Exposed
							AM 1 P-1

Area:	Pump Room E112						
	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
	None	Conc	P-1	P-1	P-1	P-1	Exposed

**AM 1 P-1**

## LATERINES

## Area: Vestibule L101

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
PTB-1	PTF-2	PTW-2	PTW-2	PTW-2	PTW-2	P-1
		CTW-2	CTW-2	CTW-2	CTW-2	

NOTE: SEE ARCH. DRWGS. I3.01 FOR **AM1 CERAMIC WALL TILE** PATTERN  
FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

## Area: Women's Latrine L102

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
PTB-1	PTF-2	PTW-2	PTW-2	PTW-2	PTW-2	P-1
		CTW-2	CTW-2	CTW-2	CTW-2	

NOTE: SEE ARCH. DRWGS. I3.01 FOR **AM 1 CERAMIC WALL TILE** PATTERN  
FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

## Area: Men's Latrine E103

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
PTB-1	PTF-2	PTW-2	PTW-2	PTW-2	PTW-2	P-2
		CTW-2	CTW-2	CTW-2	CTW-2	

NOTE: SEE ARCH. DRWGS. I3.01 FOR **AM 1 CERAMIC WALL TILE** PATTERN  
FLOOR TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

## Area: Maintenance E104

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
NONE	CONC	CTW-2	CTW-2	CTW-2	CTW-2	P-1

## SCALE RACK

## Area: Control Room S101

Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
None	Conc	P-1	P-1	P-1	P-1	P-1

Text

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 10100

VISUAL COMMUNICATIONS SPECIALTIES

11/00

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; R 1994) Performance Specifications  
and Methods of Testing for Safety Glazing  
Materials Used In Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 221 (1996) Aluminum and Aluminum-Alloy  
Extruded Bars, Rods, Wire, Profiles, and  
Tubes

ASTM B 221M (1996) Aluminum and Aluminum-Alloy  
Extruded Bars, Rods, Wire, Profiles, and  
Tubes (Metric)

ASTM C 1048 (1997b) Heat-Treated Flat Glass - Kind HS,  
Kind FT Coated and Uncoated Glass

ASTM E 84 (1999) Surface Burning Characteristics of  
Building Materials

ASTM F 148 (1995) Binder Durability of Cork  
Composition Gasket Materials

ASTM F 152 (1995) Tension Testing of Nonmetallic  
Gasket Materials

ASTM F 793 (1998) Standard Classification of  
Wallcovering by Durability Characteristics

1.2 GENERAL REQUIREMENTS

The term visual display board when used herein includes presentation boards, marker boards, tackboards, board cases, display track system and horizontal sliding units. Visual display boards shall be from manufacturer's standard product line.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturer's descriptive data and catalog cuts.  
Manufacturer's installation instructions, and cleaning and  
maintenance instructions.

TackBoards;

SD-04 Samples

Aluminum

Sections of frame, map rail two map hooks. AM 1

Section of core material showing the lamination of colored cork,  
natural cork, woven fabric, non-woven fabric, and vinyl wall  
covering. Sample of hardwood and plastic laminate finish, and  
glass type. Samples shall be minimum 100 by 100 mm and show range  
of color. AM 1

1.4 DELIVERY, STORAGE AND HANDLING

Materials shall be delivered to the building site in the manufacturer's  
original unopened containers and shall be stored in a clean dry area with  
temperature maintained above 10 degrees C. Materials shall be stacked  
according to manufacturer's recommendations. Visual display boards shall  
be allowed to acclimate to the building temperature for 24 hours prior to  
installation.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend  
beyond a one year period shall be provided.

PART 2 PRODUCTS

2.1 COLOR

Finish colors for required items shall be as specified in AM 1 Section 09915  
COLOR SCHEDULE.

2.2 MATERIALS AM 1

2.2.1 Cork

Cork shall be a continuous resilient sheet made from soft, clean,  
granulated cork relatively free from hardback and dust and bonded with a  
binder suitable for the purpose intended. The wearing surface shall be  
free from streaks, spots, cracks or other imperfections that would impair  
its usefulness or appearance. The material shall be seasoned, and a clean  
cut made not less than 13 mm from the edge shall show no evidence of soft  
sticky binder.

2.2.1.1 Colored Cork

Colored cork shall be composed of pure cork and natural color pigments that are combined under heat and pressure with linseed oil. Colored cork shall be colored throughout and shall be washable. The burlap backing shall be deeply imbedded and keyed to the work sheet being partially concealed in it and meeting the requirements of ASTM F 148.

**AM 1** 2.2.2 Woven Fabric

Fabric shall be plain weave. Fiber content shall be 100 percent polyester.

Minimum total weight shall be 496 grams plus or minus 14 grams per linear meter (16 oz. plus or minus 0.5 oz. per linear yard). Fabric shall have a Class A flame spread rating of 0-50 and smoke development rating of 0-450 in accordance with ASTM E 84.

2.2.3 Non-Woven Fabric

Fabric shall be non-woven and hooktape compatible. Fiber content shall be 100 percent polyester, 100 percent polyolefin or 100 percent nylon, backed.

Minimum total weight shall be 340 grams plus or minus 14 grams per linear meter (11 oz. plus or minus 0.5 oz. per linear yard) for 1524 mm (60 inch) .

Fabric shall have a Class A flame spread rating of 0-50 and smoke development rating of 0-450 in accordance with ASTM E 84.

2.2.4 Vinyl Wall Covering

Vinyl wall covering shall conform to ASTM F 793, Category V. Vinyl wall covering shall have a Class A flame spread rating of 0-50 and smoke development rating of 0-450 in accordance with ASTM E 84.

2.2.5 Aluminum

Aluminum frame extrusions shall be alloy 6063-T5 or 6063-T6, conform to ASTM B 221M , and be a minimum 1.5 mm thick. Exposed aluminum shall have an anodized, satin finish. Straight, single lengths shall be used wherever possible. Joints shall be kept to a minimum. Corners shall be mitered and shall have a hairline closure.

**AM 1** 2.2.6 Glass

Glass shall be comprised of tempered glass in accordance with ANSI Z97.1 and shall conform to ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class I (clear), thickness as specified.

**AM 1** **AM 1** 2.3 TACKBOARDS

2.3.1 Cork

Tackboard shall consist of a minimum **AM 1** 6 mm thick colored cork with burlap backing laminated to a minimum 6 mm thick hardboard, and shall have an aluminum frame. The size shall be as shown in the drawings.

**AM 1** PART 3 EXECUTION

3.1 PLACEMENT SCHEDULE

Location and mounting height of visual display boards shall be as shown on the drawings.

Mounting height is defined as distance from finished floor to top of the display board frame.

3.2 INSTALLATION

Installation and assembly shall be in accordance with manufacturer's

printed instructions. Concealed fasteners shall be used. Visual display boards shall be attached to the walls with suitable devices to anchor each unit. The Contractor shall furnish and install trim items, accessories and miscellaneous items in total, including but not limited to hardware, grounds, clips, backing materials, adhesives, brackets, and anchorages incidental to or necessary for a sound, secure, complete and finished installation. Installation shall not be initiated until completion of room painting and finishing operations. Visual display boards shall be installed in locations and at mounting heights indicated. Visual display boards shall be installed level and plumb, and if applicable doors shall be aligned and hardware shall be adjusted. Damaged units shall be repaired or replaced by the Contractor as directed by the Contracting Officer.

### 3.3 CLEANING

Writing surfaces shall be cleaned in accordance with manufacturer's instructions.

-- End of Section --

SECTION 10101

MISCELLANEOUS ITEMS

09/2000

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

THE ALUMINUM ASSOCIATION (AA)

AA-03 (Sep. 1980, 7th Ed.) Designation System  
for Aluminum Finishes

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

AM 1

ASTM E 814 (1983) Fire Tests of Through-Penetration  
Fire Stops

AM 1

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication/Erection/Installation Drawings.

Drawings shall be submitted for each product listed in PART 2 PRODUCTS. Drawings shall show sizes, details of construction, method of construction, method of assembling, hardware materials, colors, method of mounting, location of each item, specifications for surface preparation and installation of items, and all other details pertinent to installation. For each product, drawings shall identify all parts by name and material. Materials fabricated or delivered to the job site before approval of the drawings shall be subject to rejection.

SD-03 Product Data

Manufacturer's Catalog Data.

Fire Extinguisher Cabinets;

Public Telephone Enclosures;

SD-04 Samples

Unless otherwise indicated, samples shall be full size, taken from manufacturer's stock, and be complete as required for installation. After approval, samples may be installed in the work provided each sample is clearly identified and its location recorded. Provide one sample of each product listed in PART 2 PRODUCTS unless otherwise indicated below:

Each type tack board surface, 150 mm square.

Full-size wall clips or anchoring devices.

Each type of frame, 200 mm long.

Each type of trim trough, 200 mm long.

Each accessory, full size.

### 1.3 DELIVERY AND STORAGE

Materials and products shall be delivered to the site in the manufacturer's original unopened containers with brand name and type clearly marked. Materials and products shall be carefully handled and stored in dry, watertight enclosures.

### 1.4 FIELD MEASUREMENTS

Field measurements shall be taken prior to the preparation of drawings and fabrication to ensure proper fits.

## PART 2 PRODUCTS

### 2.1 GENERAL

Supplementary parts necessary to complete each product item shall be included even though such work is not definitely shown or specified. The Contractor shall furnish to the proper trades all anchors, sockets, or fastenings required for securing items to other construction. Details and specifications of items for which standard products are available are representative guides of requirements for such items. Standard products, generally meeting such requirements, will be accepted, if details of construction and installation are approved by the Contracting Officer.

#### 2.1.1 Metal Thickness

Gages of sheet iron and steel specified are U. S. Standard for sheet and plate. Extruded sections shall be at least 3.125 mm thick, unless otherwise specified or shown on the drawings.

#### 2.1.2 Aluminum Frames

Aluminum frames, trim, and accessories shall be fabricated of 6063-T5 or T6 extruded aluminum alloy. Corners and connections shall be hairline miter or butt joints. Exposed aluminum surfaces shall have a clear satin finish. Satin finish shall be chemically etched medium matte anodic coating, Class II Architectural, 0.4 mil thick, in accordance with AA-03.

### 2.2 BULLETIN BOARDS

[Bulletin board shall consist of a tack boards and a snap-on aluminum frame. Frame shall be secured to the wall be means of concealed screws or bolt hangers. Bulletin board shall consist of a permanent header panel

with a general title, such as "Notices" or "Information", and a 6.25 mm cork pinning surface glued to 6.25 mm thick hardboard backing. Cork shall have a plastic impregnated surface and burlap backing. The cork's surface finish shall be smooth and be free from air pockets, raised cork blemishes, and joint imperfections. Bulletin board design shall be as follows:

- a. Colors: Header panel - white letters on standard Black background; cork panel - medium gray.
- b. Dimensions: 75 mm by 150 mm .
- c. Message: Heading - upper and lower case helvetica medium, 50 mm capital letter height, flush left.

Bulletin board shall consist of a tack board, aluminum tabular frame, and hinged, swinging aluminum framed glazed doors. Frame shall be secured to the wall by means of concealed screws or bolt hangers. Bulletin board shall consist of a permanent header panel with a general title, such as "Notices" or "Information", and a 6.25 mm cork pinning surface glued to 6.25 mm thick plywood or hardboard backing. Cork shall have a plastic impregnated surface and burlap backing. The cork's surface finish shall be smooth and be free from air pockets, raised cork blemishes, and joint imperfections. Door frame shall have removable glazing bead applied on the inside. Glazing shall be 6.25 mm polished plate glass. Each bulletin board door shall be complete with hardware including key operated lock and full length piano type hinges. Hardware shall be aluminum with anodized finish matching the frame , except hinges shall be either brass with brushed chrome finish or aluminum with satin anodized finish. Bulletin board design shall be as follows:

- a. Colors: Header panel - white letters on standard black background; cork panel - medium gray.
- b. Dimensions: 75 mm by 150 mm 3'-0" by 6'-0".
- c. Message: Heading - upper and lower case helvetica medium, 50 mm capital letter height, flush left. AM 1

## 2.3 TACK BOARDS

### 2.3.1 Tack Board

Tack board shall have 6.25 mm thick core face factory laminated to a hardboard or particleboard core, and be of the thickness required so that the face of the cork will be in the same plane as the face of the writing surface. Color of the cork shall be as indicated in Section 09915 COLOR SCHEDULE.

### 2.3.2 Accessories

Accessories shall be fabricated from aluminum with snap-on holders of spring steel. Design shall be snap-on type for mounting on the display rail. Accessories shall include:

Paper holder, two per 1200 mm section of display rail.

AM 1

## 2.4 FIRE EXTINGUISHER CABINETS

Metal fire extinguisher cabinets shall be furnished and installed where shown on the drawings or specified. Cabinets to be located in fire-rated walls shall be fire-rated type, fabricated in accordance with ASTM E 814, and shall be listed by an approved testing agency for 1- and 2-hour combustible and non-combustible wall systems. The testing agency's seal shall be affixed to each fire-rated cabinet. Cabinets shall be of the recessed type suitable for 4.5 kg extinguishers. Box and trim shall be of heavy gage rolled steel. Door shall be a rigid frame with full length piano type hinge and double strength (DSA) glass panel. Door and box shall [be prime-coated inside and out] [have the manufacturer's standard white baked enamel finish inside and out].

AM 1 2.5 PUBLIC TELEPHONE ENCLOSURES

Public Telephone Enclosures shall be manufacturer's standard wall-mounted type with telephone directory shelf; minimum size - 775 mm height, 500 mm width, and 300 mm depth. Back board shall be perforated and shall enclose sound-absorbent material. Enclosure shall be finished with plastic laminate, color as selected by the Contracting Officer. Directory shelf shall be large enough to hold two directories up to 50 mm.

## PART 3 EXECUTION

## 3.1 PREPARATION AND INSTALLATION

Mounting surface preparation and product installation shall be in accordance with the product manufacturer's written recommendations.

## 3.2 BULLETIN BOARDS

Bulletin boards shall be mounted with the top edge not higher than 2000 mm above the floor.

## 3.3 CLEANING

Following installation, dirty or discolored surfaces of the products shall be cleaned, with the products left free of defects. Products that are damaged or improperly installed shall be removed and reinstalled or replaced with new products as directed.

-- End of Section --

SECTION 10442

INTERIOR SIGNAGE

09/2000

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

- |           |   |
|-----------|---|
| AA DAF-45 | (1980) Designation System for Aluminum Finishes   |
| AA SAA-46 | (1978) Standards for Anodized Architectural Aluminum  |
| AA PK-1   | (1989) Registration Record of Aluminum Association Alloy Designations and Chemical Composition Limits for Aluminum Alloys in the Form of Castings and Ingot |

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

- |            |  |
|------------|--|
| AAMA 605.2 | (1992) Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels |
|------------|--|

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- |            |  |
|------------|--|
| ANSI Z97.1 | (1984) Safety Glazing Materials Used in Buildings. |
|------------|--|

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- |             |   |
|-------------|---|
| ASTM B 211  | (1992a) Aluminum and Aluminum-Alloy Bar, Rod, and Wire              |
| ASTM B 221  | (1992a) Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes |
| ASTM C 1036 | (1991) Flat Glass   |

AMERICAN WELDING SOCIETY (AWS)

- |          |  |
|----------|--|
| AWS D1.1 | (1992) Structural Welding Code - Steel |
|----------|--|

FEDERAL SPECIFICATIONS (FS)

- |            |   |
|------------|---|
| FS L-P-387 | (Rev. A; Am. 1; Int. Am. 2) Plastic Sheet, Laminated, Thermosetting (for Designation Plates). |
|------------|---|

FEDERAL STANDARDS (FED-STD)

FED-STD 795 (Basic) Uniform Federal Accessibility  
Standards

FLAT GLASS MARKETING ASSOCIATION (FGMA)

FGMA-01 (1990) Glazing Manual

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

### SD-01 Preconstruction Submittals

Qualifications; GA.

Prior to start of sign installation, submit resumes of work experience for all installers. The work shall be done by qualified, experienced installers, working under a qualified supervisor. The supervisor shall have a minimum of 5 years experience in this area of work and shall be certified by the sign manufacturer.

Sign Schedule; GA

Prior to sign fabrication, submit sign schedule indicating type, size, location, and message of signs to be furnished and installed.

Installation Procedures; GA.

Before installation, submit the sign manufacturer's printed instructions for installation of the signs. Include complete procedures, including preparation of wall or door surfaces, mounting techniques, and recommended adhesives, tapes, or fasteners.

### SD-02 Shop Drawings

Interior Signage; GA.

Drawings shall clearly show elevations of each sign type, dimensions, materials, typographic layouts, sizes, methods, finishes, anchorages, and other details of construction as well as relation to supporting and adjacent work where applicable. Drawings shall include typical layouts of each sign type showing graphic quality, letterforms, symbols, and type spacing, and a schedule showing the location of each sign type.

### SD-03 Product Data

Interior Signage; GA.

Submit manufacturer's catalog data, describing the sign type, materials, and fabrication for each sign type furnished for this project.

### SD-04 Samples

Interior Signage; GA.

Submit one full size sample of each sign type in the quality and color specified. The samples may be installed in the work provided each sample is identified and location recorded.

#### SD-10 Operation and Maintenance Data

##### Sign Maintenance Instructions; GA

Submit three copies of the sign manufacturer's maintenance instructions, including one quart of any special cleaning solution recommended and furnished by the manufacturer. Cleaning solution(s) shall be properly marked. Instructions shall include the recommended type of cleaning equipment and materials, cleaning methods, and cleaning cycles.

### 1.3 DELIVERY AND STORAGE

Deliver signs to the site in manufacturer's original wrappings and packages clearly labeled with the manufacturer's name, brand name, size and related information. Each sign shall be individually packaged. Store in a safe, dry, clean, and well ventilated area, protected from damage, soiling, and moisture. Store packages flat. Do not open containers until needed for installation unless verification inspection is required. Protective paper shall be removed only as necessary during fabrication, inspection, or installation in order to avoid scratching, chipping, or crazing the acrylic sheets.

## PART 2 PRODUCTS

### 2.1 GENERAL

Interior signs and graphics shall be provided as a total system. Signs shall be complete with lettering, framing as detailed, and related components for a complete installation. Signs shall be the standard product of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate signs that have been in satisfactory use at least 2 years prior to bid opening.

### 2.2 MATERIALS AND FINISHES

#### 2.2.1 Framing and Fasteners

##### 2.2.1.1 Aluminum Alloy Products

Aluminum extrusions shall be at least 3.2 mil thick, and aluminum plate or sheet shall be at least 1.5 mm thick. Extrusions shall conform to ASTM B 221; plate and sheet shall conform to ASTM B 209. Where anodic coatings are specified, alloy shall conform to AA PK-1 alloy designation 514.0. Exposed anodized aluminum finishes shall be as shown and shall conform to AA SAA-46.

##### 2.2.1.2 Finishes

**AM 1** Aluminum used for concealed framing of sign shall have a mill finish. Aluminum used for exposed surfaces shall have anodized finish. Anodized finish shall be AA DAF-45 designation AA-M10-C22-A32, Architectural Class II (0.01 mm to 0.02 mm ) for integral color as specified in Section 09915 COLOR SCHEDULE.

##### 2.2.1.3 Welding

Welded joints shall be heliarc welded in conformance with the AWS D1.1 and

the Aluminum Association's publications.

#### 2.2.1.4 Exposed Metal Fasteners

Exposed metal fasteners shall be hardened aluminum ASTM B 211, 6061, T6 Alloy.

#### 2.2.1.5 Adhesives

Adhesives and adhesive tapes required for plastics, glass, and metals shall be the type recommended by the sign manufacturer.

#### 2.2.2 Plastic

Signs shall be fabricated of Type ES melamine plastic conforming to FS L-P-387, Type NDP self-extinguishing or acrylic conforming to ANSI Z97.1. Plastic sheet used for signs shall be of new stock and free from defects which would impair strength, durability, and appearance. Clear face sheets shall be matte finish. Colored, opaque face plates and plaques shall be smooth finish.

#### 2.2.3 Changeable Letter Boards

Changeable letter boards for building and floor directory signs shall be pre-slotted, nonfading, washable vinyl which accept molded plastic letters (white in color) with tabs that align the letters in the slots. Boards shall be 4.7 mm to 6.4 mm thick.

#### 2.2.4 Glass

Glass shall be polished clear plate glass with clean cut edges conforming to ASTM C 1036. All glazing work shall be performed in accordance with applicable standards of the FGMA-01.

#### 2.2.5 Signs

Signs, other than building directory signs, shall be matte, opaque colored acrylic plastic having top surface printed message, 3.2 mm minimum thickness (including backing plate) sub-surface printed face plates shall be laminated to a backing plate. Signs shall conform to FED-STD 795.

##### 2.2.5.1 Fabrication

All signs and sign components shall be shop fabricated, complete and ready for installation. Sign components shall be cut clean. Rounded corners, cut or ragged edges, edge build-up, bleeding or imperfections in the surfaces of the acrylic sheet will not be acceptable.

##### 2.2.5.2 Paints and Inks

Paints and inks required shall be made for the surface material on which they are to be applied and as recommended by the manufacturer of the paint or ink. Prime coats or other surface pretreatments, where applicable, shall be included in the work. Paints, inks and all finishes shall not be the cause of discoloration, deterioration or delamination of any materials used in the fabrication. Paints and inks shall be evenly applied without pinholes, scratches, peeling, or application marks. Paints may be alkyd, acrylic, epoxy, or urethane enamel that are qualified for listing on the applicable GSA qualified products list.

##### 2.2.5.3 Messages

Messages for insert panels of office identification signs shall be:

- b. Dry-transfer letters applied to paper card stock.

#### 2.2.5.4 Letterforms and Graphics

##### a. Die-Cut Vinyl Letters

Vinyl sheeting for die-cut graphics shall conform to MS MIL-M-43719, minimum 0.08 mm film thickness. The sheeting shall include a positionable precoated pressure sensitive adhesive backing (Class 3). Die-cutting shall be executed in such a manner that all edges and corners of finished letterforms and graphics shall be true and clean. Letterforms and graphics with rounded positive or negative corners, nicked, cut or ragged edges, shall not be used. Permanently apply die-cut letters and graphics to sign surfaces in such a manner that all letter surface and edge areas are tightly and evenly adhered to the sign surface. AM 1

##### f. Letter Size and Style

Letterforms, including numbers, shall be helvetica medium style, upper and lower case, and shall be the height indicated in sign standards, unless otherwise specified or indicated. In addition,

- (1) Edges and corners of finished letterforms shall be photographically precise, crisp, clean and free of ticks, discontinuous curves, line wave, cut or ragged edges, edge built-up, bleeding, surface pinholes and other imperfections. All letterforms shall conform to the prescribed letterform proportions.

- (2) Alignment of letterforms shall maintain a horizontal baseline.

- (3) Letter spacing shall be normal. Expanded or condensed spacing is not acceptable.

#### 2.3 SIGN STANDARDS

##### 2.3.1 Sign Grids

See drawings for the applicable sign types for sign dimensions and mounting heights.

##### 2.3.2 Office Identification Signs AM 1

###### 2.3.2.1 Type BB2 (Wall Mounted)

This type consist of a permanent header panel with the room number and an insert panel which identifies the tenant. The insert panel shall be a clear sleeve which will accept a paper or plastic insert with the name of

the tenant. Sign design shall be as follows:

a. Colors:

Header panel - Base standard.

Insert panel - Base standard.

b. Dimensions: 230 mm by 230 mm .

c. Message:

Room number - Helvetica medium, 38 mm in height, flush left.

Tenant name - Upper and lower case helvetica medium, 13 mm capital letter height, flush left.

Secondary information - Upper and lower case helvetica regular, 13 mm capital letter height, flush left.

The insert area shall accommodate four lines with a maximum of 21 tiles or characters per line.

**AM 1** 2.3.2.2 [Enter Appropriate Subpart Title Here]

2.3.3.4 Type BB4 (Room Number Sign)

This type consists of a permanent header panel only (without an insert panel). Mounting height shall be 1,700 mm (top edge of sign) above the floor. Sign design shall be as follows:

a. Colors:

Header panel - Base Standard.

b. Dimensions: 76 mm by 230 mm.

c. Message:

Room number - Helvetica medium, 38 mm in height, flush left.

2.3.3 Service Identification Sign (Type BB7)

This type identifies restrooms, telephones, and other services. Sign design shall be as follows:

a. Colors:

Symbols - Base Standard.

b. Dimensions: 230 mm by 150 mm .

c. Message:

Service name - Helvetica medium upper and lower case, 25 mm capital letter height, centered.

The message line will accommodate a maximum of 7 tiles.

2.3.4 Regulatory Signs

Symbols, such as for "No Smoking", shall be black with a standard red circle and bar on a white background. Written messages are not required.

#### 2.3.4.1 Type DD1

- a. Dimensions: 230 mm by 230 mm .
- b. Symbol: 190 mm by 190 mm square.

#### 2.4 SIGNAGE SCHEDULE

All sign types shall be coordinated with the user for tenant listings.

### PART 3 EXECUTION

#### 3.1 GENERAL

Signs shall be mounted in place after all other interior work in the immediate vicinity, including painting, has been completed. Installed signs shall be uniform and secured.

#### 3.2 INSTALLATION PREPARATION

Inspect all room and areas to have signs. Repair holes, cracks, depressions, or rough areas using recommended materials. Walls shall be free of any foreign materials. Minimum wall temperature before, during and after installation and requirements for conditioning adhesive, shall comply with the sign and adhesive manufacturer's instructions. Sign installation shall constitute validation by the Contractor that the conditions in the area meet all requirements for satisfactory installation.

#### 3.3 INSTALLATION

Height and location of the signs shall be as directed by the Contracting Officer unless otherwise specified. Signs shall be mounted using vinyl tape, adhesive, or screws, as recommended by the manufacturer for the specific application. Adhesive shall cover the entire back surface of the sign panels. Screw attached signs shall be attached with two concealed non-ferrous screws, one centered at each end in a manner that will not interfere with the message. Signs larger than two inches in height shall be attached with four screws, equally spaced, one in each corner. Color of screws shall bemark the background color of the sign.

##### 3.3.1 Sign Type BB7

Restroom door identification signs shall be centered on the door. Signs with the handicapped symbol shall be centered and located beneath the identification sign on doors of restrooms having handicapped provisions.

#### 3.4 SIGN DAMAGE

In event of damage to any sign or sign component, the Contractor shall repair or replace the signs or components as required by the Contracting Officer, at no additional cost to the Government.

#### 3.5 CLEANUP

All installed signs and adjacent surfaces shall be free of tape, adhesive, packing paper, dirt, smudges, scratches, discoloration, or other foreign material or defect. The Contractor shall clean all signs in accordance with the manufacturer's instructions.

-- End of Section --

SECTION 10650

OPERABLE PARTITIONS

08/00

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 84	(1999) Surface Burning Characteristics of Building Materials
ASTM E 90	(1999) Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
ASTM E 413	(1987; R 1999) Rating Sound Insulation

1.2 GENERAL REQUIREMENTS

The Contractor shall supply and install flat wall, manual operation, acoustical operable partitions as shown on the drawings including all hardware, seals, track and rollers as needed to close the specified opening. The partition shall be made up of a series of rigid, flat wall panels; each panel being a one-piece assembly nominally 1.2 m wide. Unless otherwise specified, the wall shall comprise the least number of panels. The mechanical seal of the panel shall actuate with a single operating action.

1.2.1 Manual Operation

The manual operation shall be accomplished with less than 89 N force to start movement at the rate of 1.02 m/s . A removable handle shall be used to extend and retract the bottom operable seals; vertical movement of seals shall be 50 mm . Closure to the lead wall shall be by use of a flexible bulb; final closing shall be accomplished by means of a lever exerting pressure against wall.

1.3 SUBMITTALS

All items designated with a G, including product literature, calculations, component data, certificates, diagrams and drawings, shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL

PROCEDURES:

SD-02 Shop Drawings

Operable Partitions; G.

Drawings containing complete schematic diagrams and details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances for maintenance and operation.

SD-03 Product Data

Operable Partitions; G.

Manufacturer's descriptive data, performance charts, catalog cuts, and installation instructions.

SD-04 Samples

Operable Partitions; G.

Color samples of specified surfaces and finishes to match those specified. Finish and color requirements shall not be limited to manufacturer's standard selections in order to meet these requirements.

SD-07 Certificates

Materials; G.

Operable Partitions; G.

Certificate attesting that the materials meet the requirements specified and that partitions have specified acoustical and flame retardant properties, as determined by test.

SD-10 Operation and Maintenance Data

Operable Partitions; G.

Six complete copies of operating instructions outlining the procedures required for AM 1 operable partitions. The instructions shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and operating features. Data shall include a complete list of parts and supplies, with current unit prices and source of supply, and a list of the parts recommended by the manufacturer to be replaced after 1 year and 3 years of service. Six complete copies of maintenance instructions explaining routine maintenance procedures including inspection, adjustments, lubrication, and cleaning. The instructions shall list possible breakdown, methods of repair, and a troubleshooting guide. The instructions shall include equipment layout and simplified wiring and control diagrams of the system as installed.

1.4 DELIVERY AND STORAGE

Materials shall be delivered to the jobsite in the manufacturer's original, unopened packages and shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

## 1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

## PART 2 PRODUCTS

### 2.1 MATERIALS

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 year prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site. Door and partition finishes shall have a Class A rating when tested in accordance with ASTM E 84.

#### 2.1.1 Panel Surface Finish

Panel surface finish shall be a vertically-ribbed acoustical synthetic fabric material of 100 percent polyolefin. Pile height shall be minimum 2.5 mm thickness. Color shall match that listed in the drawing Interior Finish Materials Legend.

#### 2.1.2 Hardware

Operable partitions shall have manufacturer's standard hardware. Hardware shall be anodized aluminum with a natural finish, chrome plated or brass plated metal, or painted finish.

#### 2.1.3 Sweep Strips

Sweep strips shall be vinyl or other material which will not crack or craze with severe usage. Sweep strip shall control STC to the specified rating.

#### 2.1.4 Track

Track shall be recessed as shown and shall be of extruded aluminum or enamel finish steel. Track shall be manufacturer's standard product designed for the weight of the finished partition, including door. Track sections shall be provided in the maximum lengths practicable, not less than 1.8 m long except for narrow doors and at ends of runs where short length is required. Suitable joint devices such as interlocking keys shall be provided at each joint to provide permanent alignment of track.

#### 2.1.5 Metal Soffit

Soffit shall be provided when steel track is recessed. Soffit shall be of metal of adequate thickness to protect the ceiling from damage by door operation and shall be provided with the door manufacturer's standard neutral-color applied finish. Soffit on aluminum track shall be an integral part of the track.

#### 2.1.6 Vinyl Restrictions

Vinyls shall contain a non-mercury based mildewcide and shall be manufactured without the use of cadmium-based stabilizers.

### 2.2 OPERABLE PARTITIONS

Operable partitions shall consist of top hung ball bearing carriers which support paired modular panels. Partition finish shall have a flame spread rating of not more than 25 in accordance with ASTM E 84.

### 2.2.1 Panels

Panels shall be constructed of minimum 1.9 mm thick steel frames with minimum 0.80 mm thick face panels spot welded to the frame. Panels shall be not more than 1.2 m wide, except for end closure panels, and shall be full height to track. Panels shall lock in place to form a stable, rigid partition; low profile hinges shall project 6 mm maximum from panel edge. Panels shall be surfaced with material noted in Section 09915, COLOR SCHEDULE which wraps around the vertical panel edges without vertical trim.

Panel thickness (100 mm nominal) and composition shall be designed to provide an STC rating of not less than 50 in accordance with ASTM E 90 and ASTM E 413.

### 2.2.2 Doors

Doors shall have vinyl sweep top seals which compress against the bottom of the top track. Doors shall be nonfire rated and shall be manually operated.

### 2.2.3 Seals

Bottom seals shall consist of a vinyl sweep mechanical seal which will expand in place or shall be accomplished by using panels which can be lowered by a removable operating device. Vertical seal between panels shall be anodized, architectural grade, aluminum extrusion with vinyl sound seal.

## 2.3 COLOR

Color shall be in accordance with Interior Finish Legend included in the drawings.

## PART 3 EXECUTION

### 3.1 INSTALLATION

Installation shall be in accordance with the manufacturer's approved installation instructions.

-- End of Section --

SECTION 10800

TOILET ACCESSORIES

08/98

AMENDMENT 00001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 1036 (1991) Flat Glass

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-2380 (Rev A) Dispenser, Paper Towel

CID A-A-2398 (Rev B) Curtain, Shower and Window (Metric  
- SI)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Finishes  
Accessory Items

Manufacturer's descriptive data and catalog cuts indicating materials of construction, fasteners proposed for use for each type of wall construction, mounting instructions, operation instructions, and cleaning instructions.

SD-04 Samples

Finishes  
Accessory Items

One sample of each accessory proposed for use. Approved samples may be incorporated into the finished work, provided they are identified and their locations noted.

AM 1 SD-10 Operation and Maintenance Data

Electric Hand Dryer

Four complete copies of maintenance instructions listing routine maintenance procedures and possible breakdowns and repairs. Instructions shall include simplified wiring and control diagrams and other information necessary for unit maintenance.

### 1.3 DELIVERY, STORAGE, AND HANDLING

Toilet accessories shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area protected from construction damage and vandalism.

### 1.4 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

## PART 2 PRODUCTS

### 2.1 MANUFACTURED UNITS

Toilet accessories shall be provided where indicated in accordance with paragraph SCHEDULE. Porcelain type, tile-wall accessories are specified in Section 09310 CERAMIC TILE. Each accessory item shall be complete with the necessary mounting plates and shall be of sturdy construction with corrosion resistant surface.

#### 2.1.1 Anchors and Fasteners

Anchors and fasteners shall be capable of developing a restraining force commensurate with the strength of the accessory to be mounted and shall be suited for use with the supporting construction. Exposed fasteners shall [have oval heads] [be of tamperproof design] and shall be finished to match the accessory.

#### 2.1.2 Finishes

Except where noted otherwise, finishes on metal shall be provided as follows:

Metal	Finish
Stainless steel	No. 4 satin finish
Carbon steel, copper alloy, and brass	Chromium plated, bright

### 2.2 ACCESSORY ITEMS

Accessory items shall conform to the requirements specified below.

#### 2.2.1 Grab Bar (GB)

Grab bar shall be 18 gauge, 32 mm OD Type 304 stainless steel. Grab bar shall be form and length as indicated. [Exposed] mounting flange shall have mounting holes concealed. Grab bar shall have [peened non-slip surface]. Installed bars shall be capable of withstanding a 2.225 kN vertical load without coming loose from the fastenings and without obvious permanent deformation. Space between wall and grab bar shall be 38 mm.

#### 2.2.2 Mirrors, Glass (MG)

Glass for mirrors shall be Type I transparent flat type, Class 1-clear. Glazing Quality q1 6 mm thick conforming to ASTM C 1036. Glass shall be coated on one surface with silver coating, copper protective coating, and mirror backing paint. Silver coating shall be highly adhesive pure silver coating of a thickness which shall provide reflectivity of 83 percent or more of incident light when viewed through 6 mm thick glass, and shall be

free of pinholes or other defects. Copper protective coating shall be pure bright reflective copper, homogeneous without sludge, pinholes or other defects, and shall be of proper thickness to prevent "adhesion pull" by mirror backing paint. Mirror backing paint shall consist of two coats of special scratch and abrasion-resistant paint and shall be baked in uniform thickness to provide a protection for silver and copper coatings which will permit normal cutting and edge fabrication.

#### 2.2.3 Mirror, Metal (MM)

Metal mirror shall be bright polished stainless steel, mirror quality, 0.94 mm minimum thickness, edges turned back 6 mm and recess fitted with tempered hardboard backing, and theft-proof fasteners. Size shall be in accordance with paragraph SCHEDULE.

#### 2.2.4 Paper Towel Dispenser (PTD)

Paper towel dispenser shall conform to CID A-A-2380, Type [I, shall be constructed of not less than [0.683 mm Type 304 stainless steel], and shall be [recessed] mounted. Dispenser shall have a towel compartment and a [mirror door] . Locking mechanism shall be [tumbler key lock].

#### 2.2.5 Combination Paper Towel Dispenser/Waste Receptacle Units (PTDWR)

Dispenser/receptacle shall be [recessed] and shall have a capacity of 400 sheets of C-fold, single-fold, or quarter-fold towel. Waste receptacle shall be designed to be locked in unit and removable for service. Locking mechanism shall be tumbler key lock. Waste receptacle shall have a capacity of [45] L. Unit shall be fabricated of not less than 0.8 mm stainless steel welded construction with all exposed surfaces having a satin finish. Waste receptacle that accepts reusable liner standard for unit manufacturer shall be provided.

#### 2.2.6 Shower Curtain (SC)

Shower curtain shall conform to CID A-A-2398, Style I, size to suit conditions. Curtain shall be anti-bacterial nylon/vinyl fabric. Color shall be [as shown in Section 09915 COLOR SCHEDULE].

#### 2.2.7 Shower Curtain Rods (SCR)

Shower curtain rods shall be Type 304 stainless steel 32 mm OD by 1.24 mm minimum straight to meet installation conditions.

#### 2.2.8 Soap Dispenser (SD)

Soap dispenser shall be surface mounted, liquid type consisting of a vertical Type 304 stainless steel tank with holding capacity of 1.2 L with a corrosion-resistant all-purpose valve that dispenses liquid soaps, lotions, detergents and antiseptic soaps.

#### 2.2.9 Soap Holder (SH)

Soap holder shall be surface mounted Type 304 stainless steel. Separate supports shall be stainless steel.

#### 2.2.10 Shelf, Metal, Heavy Duty (SMHD)

Heavy duty metal shelf shall be minimum of 18 gauge stainless steel with hemmed edges. Shelves over 750 mm shall be provided with intermediate supports. Supports shall be minimum of 16 gauge, shall be welded to the shelf, and shall be spaced no more than 750 mm apart.

## 2.2.11 Shelf, Metal, Light Duty (SMLD)

Light duty metal shelf shall be supported between brackets or on brackets. Brackets shall prevent lateral movement of the shelf. Shelf shall be 600 mm long. Shelf and brackets shall be stainless steel.

**AM 1** 2.2.12 Towel Pin (TP)

Towel pin shall have concealed wall fastenings, and a pin integral with or permanently fastened to wall flange. Maximum projection shall be 100 mm. Design shall be consistent with design of other accessory items. Finish shall be **AM 1** satin.

## 2.2.13 Toilet Tissue Dispenser (TTD)

Toilet tissue holder shall be Type II - surface mounted] with two rolls of standard tissue mounted horizontally. Cabinet shall be **AM 1** stainless steel, satin finish.

## 2.2.14 Toilet Seat Cover Dispenser (TSCD)

Toilet seat cover dispensers shall be Type 304 stainless steel and shall be surface mounted. Dispenser shall have a minimum capacity of 500 seat covers.

2.2.15 **AM 1** Electric Hand Dryer (EHD)

Electric hand dryer shall be wall mounted and shall be designed to operate on 110/125 volts, 60 cycle, single phase alternating current with a heating element core rating of not more than 2100 watts. Dryer housing shall be of single piece construction and shall be chrome plated steel.

## PART 3 EXECUTION

## 3.1 INSTALLATION

Toilet accessories shall be securely fastened to the supporting construction in accordance with the manufacturer's approved instructions. Accessories shall be protected from damage from the time of installation until acceptance.

## 3.2 CLEANING

Material shall be cleaned in accordance with manufacturer's recommendations. Alkaline or abrasive agents shall not be used. Precautions shall be taken to avoid scratching or marring of surfaces.

3.3 SCHEDULE **AM 1**

Accessories Required

<u>Room or Space</u>	<u>MG</u>	<u>PTD</u>	<u>HD</u>	<u>SD</u>	<u>SND</u>	<u>TTD</u>
<u>ADMIN</u> <u>BLDG</u>	<u>WOMEN'S LATRINE</u>					
	4	1	1	3	7	7
<u>ADMIN</u> <u>BLDG</u>	<u>MEN'S LATRINE</u>					
	5	1	1	4	0	5
<u>ENGINE</u> <u>SHOP</u>	<u>WOMEN'S LATRINE</u>					
	1	0	1	1	1	1
<u>ENGINE</u> <u>SHOP</u>	<u>MEN'S LATRINE</u>					
	1	0	1	1	0	1
<u>LATRINE</u> <u>FACILITY</u>	<u>WOMEN'S LATRINE</u>					
	3	1	1	1	4	4
<u>LATRINE</u> <u>FACILITY</u>	<u>MEN'S LATRINE</u>					
	5	1	1	4	0	3

-- End of Section --

SECTION 12600

THEATER CHAIRS

01/98

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3597 (1995a) Woven Upholstery Fabrics-Plain,  
Tufted, or Flocked

ASTM D 3690 (1995a) Performance Specification for  
Vinyl-Coated and Urethane-Coated  
Upholstery Fabrics--Indoor

HARDWOOD PLYWOOD VENEER ASSOCIATION (HPVA)

HPVA HP-1 (1994) Interim Voluntary Standard for  
Hardwood and Decorative Plywood

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3 (1995) High-Pressure Decorative Laminates

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation; G

Drawings indicating metal thickness, fastenings, details of hinge mechanism, seat and back dimensions, proposed finish, and including seating plans showing row spacing, row lengths, the varying lateral spacing at backs and seats, back pitch, and chair widths for the various section lengths, floor pitch, and riser height, where applicable.

SD-03 Product Data

Theater Chairs; G

Manufacturer's descriptive data, catalog cuts, and installation instructions.

SD-04 Samples

Theater Chairs; G

Samples of upholstery, plywood, laminate, paint, and plastic finish materials and one complete chair. Fabric samples shall be of sufficient size to show color range, pattern, and finish. Chair sample may be incorporated into the installation, provided it is identified and the location noted.

### 1.3 DELIVERY AND STORAGE

Theater chairs shall be delivered to the site in unopened containers clearly labeled with the manufacturer's name and container contents. Materials shall be stored in a safe, dry, and clean location. Handling of items shall be in a manner that will protect the materials from damage.

### 1.4 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Fabric Upholstery

Woven fabric shall conform to ASTM D 3597. Fabric shall be monofilament polyolefin or polyester, 9oz per 54" running yard or better. Fabric shall be treated to resist staining and soiling. color and pattern shall be selected from manufacturer's standard materials.

#### 2.1.2 Molded Polyurethane Foam

Polyurethane foam shall be high density, fire retardant, nonhardening and nonoxidizing and shall have a high resistance to alkalies, oils, grease, soaps, abrasions, moisture, mildew, and tearing. Cut or slab foam will not be accepted.

### 2.2 CHAIRS

Chair components and assembly shall be free from objectionable projections or irregularities. Corners and edges shall be smooth and rounded. Bolts, nuts, and other fastenings shall be capped. Steel shall be well-formed to shape and size required. Jointing of members shall be welded, riveted, or interlocked. Exposed welds shall be ground and dressed smooth. Casting shall be fine textured, sound, and free of pits, blow holes, and fins. Lines shall be true, accurate, and true-to-pattern with excess metal or imperfections removed. Fastening shall be concealed where possible.

#### 2.2.1 Chair Backs

Back assembly shall be oval steel tube, 3/5" x 1/2". Finish shall be epoxy powder coating with thermal set with an upholstered panel shrouding the back. Rear panel shall completely conceal and protect the rest of the seat assembly when in the raised position. Back shall be fixedtype.

##### 2.2.1.1 Molded Foam Padding

Polyurethane foam shall be high density, fire retardant and shall be not less than approximately 95 mm in thickness and shall be securely attached to the steel or plywood panel and completely covered with the approved upholstery material.

#### 2.2.2 Seats

Foundation for upholstered seats shall be over cross laminated veneer. The seat foundation shall be free from visible screws, bolts, open holes, and projections on the bottom, front, and sides. The upholstered seat unit shall be easily removable without removing the foundation unit; and the covering shall be fastened to the frame in a manner that will permit easy reupholstering.

#### 2.2.3 Hinges

Hinges shall be a counterweight mechanism using gravity to return to the upright position or of the full compensating type, completely enclosed, totally independent, free and easy in operation, and capable of compensating for circular installation, variation in installation conditions, and unevenness of floors. Each hinge shall have a noiseless, self-rising seat device, shall rise automatically to a uniform safety position of 3/4 fold at all times, and shall fold 100 percent when additional pressure is applied, to provide additional clearance. The hinges shall have oil-impregnated, self-lubricating, metal or brass alloy bearings that will not require further lubrication, or nylon bushings. Hinges shall have a spring tension adjustment mechanism to allow manual compensation for normal wear and fatigue.

#### 2.2.4 Standards

##### 2.2.4.1 Floor Standards

Floor standards shall be tubular steel, sheet steel, or cast iron. The standards shall be formed to fit the floor and the hinge point will be at a height that will maintain proper relation of seat to floor. The feet shall be formed to eliminate tripping hazards and shall have holes for bolt attachment to the floor.

##### 2.2.4.2 Aisle and End Standards

Aisle or end standard panels shall be finished with fully upholstered side panels, floor to armrest cap. Middle standards shall be designed to match basic aisle or end standard configuration.

#### 2.2.5 Armrests

Armrests shall be mar-proff, resilient polyurethane..

#### 2.2.6 Tablet Arm

Each chair shall be equipped with a fold-away phenolic tablet arm assembly. Laminate-surfaced particle board will not be accepted. Tablet arm shall be "anti-panic"; in an emergency situation, tablet arm shall automatically return, out of the aisle, and into its retracted position, if impacted. Color shall be as selected. All edges shall be rounded.

### 2.3 FINISH

Wood and metal surfaces shall be given the manufacturer's standard finishes.

### 2.4 COLOR

Color shall be in accordance with Section 09915 COLOR SCHEDULE.

## PART 3 EXECUTION

### 3.1 SEATING SYSTEM

The system shall permit the standards to be installed on radial lines from

a common center for which concentric circles are determined with each row of units utilizing common middle standards. Standards in each row shall be placed laterally so the aisle-end standards will be in alignment as indicated on seating layout drawing. The angle of inclination of backs shall be adjusted for variations in sightlines. Mechanical attachment of components shall be of sufficient flexibility so that when permanently assembled they will compensate for the changing dimensions laterally between standards caused by convergence toward the center. Seat and back attachments shall absorb inaccuracies in lateral spacing of standards at point of attachment caused by unevenness of floor. Varying lateral dimensions of backs and seats shall be in accordance with approved seating layout. Minimum width of seating unit shall be 500 mm and may be used only to complete a specific row dimension.

### 3.2 INSTALLATION

Installation of theater chairs shall be in accordance with the seating drawings and approved installation instructions.

-- End of Section --

SECTION 13120

STANDARD METAL BUILDING SYSTEMS  
09/98  
Amendment 0001

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

- AA-01 (1997) Aluminum Standards and Data
- AA-02 (1994) Aluminum Design Manual:  
Specification & Guidelines for Aluminum  
Structures

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

- AAMA AAMA/NWWDA 101 (1997) Voluntary Specifications for  
Aluminum, Vinyl (PVC) and Wood Windows and  
Glass Doors

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

- AISC FCD (1995a) Quality Certification Program  
Description
- AISC Pub No. S303 (1992) Code of Standard Practice for Steel  
Buildings and Bridges
- AISC Pub No. S329 (1985; Appx A June 1994) Allowable Stress  
Design Specification for Structural Joints  
Using ASTM A 325 or A 490 Bolts
- AISC-04 (1989) Specification for Structural Steel  
Buildings - Allowable Stress Design,  
Plastic Design
- AISC Pub No. S342 L (1993) Load and Resistance Factor Design  
Specification for Structural Steel  
Buildings

AMERICAN IRON AND STEEL INSTITUTE (AISI)

- AISI-01 (1996) Cold-Formed Steel Design Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM A 36/A 36M (1997a) Carbon Structural Steel
- ASTM A 53 (1997) Pipe, Steel, Black and Hot-Dipped,  
Zinc-Coated, Welded and Seamless
- ASTM A 252 (1996) Welded and Seamless Steel Pipe Piles
- ASTM A 325 (1997) Structural Bolts, Steel, Heat

	Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 325M	(1993) High-Strength Bolts for Structural Steel Joints (Metric)
ASTM A 463/A 463M	(1996a) Steel Sheet, Aluminum-Coated by the Hot-Dip Process
ASTM A 490	(1997) Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
ASTM A 490M	(1993) High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric)
ASTM A 500	(1996) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 501	(1996) Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 529/A 529M	(1996) High-Strength Carbon-Manganese Steel of Structural Quality
ASTM A 570/A 570M	(1996) Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
ASTM A 572/A 572M	(1997a) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 588/A 588M	(1997) High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick
ASTM A 606	(1997) Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM A 607	(1996) Steel, Sheet and Strip, High-Strength, Low-Alloy, Columbium or Vanadium, or Both, Hot-Rolled and Cold-Rolled
ASTM A 618	(1996) Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing
ASTM A 653/A 653M	(1997) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 792/A 792M	(1997) Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM B 117	(1997) Operating Salt Spray (Fog) Apparatus
ASTM B 209	(1996) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 209M	(1995) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)

ASTM B 221	(1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 221M	(1996) Aluminum and Aluminum-Alloy Extruded Bars, rods, Wire, Profiles, and Tubes (Metric)
ASTM B 241/B 241M	(1996) Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube
ASTM B 308/B 308M	(1996) Aluminum-Alloy 6061-T6 Standard Structural Profiles
ASTM B 429	(1995) Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM C 518	(1991) Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C 553	(1992) Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM C 578	(1995) Rigid, Cellular Polystyrene Thermal Insulation
ASTM C 612	(1993) Mineral Fiber Block and Board Thermal Insulation
ASTM C 991	(1992) Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings
ASTM C 1289	(1995) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM D 522	(1993a) Mandrel Bend Test of Attached Organic Coatings
ASTM D 523	(1989; R 1994) Specular Gloss
ASTM D 714	(1987; R 1994) Evaluating Degree of Blistering of Paints
ASTM D 968	(1993) Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D 1308	(1987; R 1993) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D 1654	(1992) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
ASTM D 2244	(1993) Calculation of Color Differences from Instrumentally Measured Color Coordinates
ASTM D 2247	(1994) Testing Water Resistance of Coatings in 100 % Relative Humidity

ASTM D 2794 (1993) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

ASTM D 3359 (1995a) Measuring Adhesion by Tape Test

ASTM D 3841 (1992) Glass-Fiber-Reinforced Polyester Plastic Panels

ASTM D 4214 (1997) Evaluating the Degree of Chalking of Exterior Paint Films

ASTM D 4397 (1996) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications

ASTM D 4587 s(1991) Conducting Tests on Paint and Related Coatings and Materials Using a Fluorescent UV-Condensation Light - and Water-Exposure Apparatus

ASTM E 84 (1996a) Surface Burning Characteristics of Building Materials

ASTM E 96 (1995) Water Vapor Transmission of Materials

## AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (1998) Minimum Design Loads for Buildings and Other Structures

## AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 (1996) Structural Welding Code - Steel

## MATERIAL HANDLING INDUSTRY (MHI)

MHI CMAA 70 (1994) Electric Overhead Traveling Cranes

## METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA)

MBMA-01 (1996) Low Rise Building Systems Manual

## SHEET METAL &amp; AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA-02 (1993; Errata) Architectural Sheet Metal Manual

## STEEL DOOR INSTITUTE (SDOI)

SDOI SDI-100 (1991) Standard Steel Doors and Frames

## STEEL WINDOW INSTITUTE (SWI)

SWI-01 (1995) The Specifier's Guide to Steel Windows

## UNDERWRITERS LABORATORIES (UL)

UL 580 (1994; Rev thru Sep 1997) Tests for Uplift Resistance of Roof Assemblies

## 1.2 GENERAL REQUIREMENTS

The metal building system covered under this specification shall be provided by a single manufacturer and shall include all components and assemblies that form a building. Structural Standing Seam Metal Roofing System, when specified, shall be furnished as part of a single manufacturer's system.

### 1.2.1 Building Configuration

Buildings shall have structural steel main building frames, and secondary framing including purlins and girts, engineered and fabricated by the building systems supplier. Buildings shall have vertical steel walls and gable roof system including gutters and downspouts. Roof slope shall be as shown on the drawings. Buildings shall be single-span or multiple-span structures with one of the following framing systems: column with rigid frame or 'X' bracings. Exterior doors, overhead doors, louvers and translucent panels shall be included in the metal building system. Building dimensions shall be not less than those indicated. The minimum inside clear dimensions shall be as shown on the drawings.

### 1.2.2 Qualifications

#### 1.2.2.1 Manufacturer

Metal building shall be the product of a recognized steel building systems manufacturer who has been in the practice of manufacturing steel building systems for a period of not less than 5 years. The manufacturer shall be chiefly engaged in the practice of designing and fabricating steel building systems. The manufacturer shall be certified under the Metal Building Systems (MB) Certification Program, AISC FCD. Structural framing and covering shall be designed by a licensed Professional Engineer experienced in design of this work.

#### 1.2.2.2 Installer

Erector shall have specialized experience in the erection of steel building systems for a period of at least 3 years. Framing shall be erected in accordance with MBMA-01, common industry practices and erection instructions describing the basic sequence of assembly, temporary bracing, shoring, and related information necessary for erection of the metal building including its structural framework and components. The erector shall furnish temporary guys and bracing where needed for squaring, plumbing, and securing the structural framing against loads acting on the exposed framing, such as wind loads and seismic forces, as well as loads due to erection equipment and erection operation. Bracing furnished by the manufacturer for the metal building system shall not be assumed to be adequate during erection. Structural members shall not be field cut or altered without approval of the metal building manufacturer. Welds, abrasions, and surfaces not shop primed shall be primed after erection.

#### 1.2.2.3 Manufacturer's Representative

A representative designated by the building manufacturer, who is familiar with the design of the building supplied and experienced in the erection of metal buildings similar in size to the one required under this contract, shall be present at the job site during construction, from the start of the structural framing erection until completion of the installation of the exterior covering, to assure that the building is erected properly.

## 1.3 DESIGN REQUIREMENTS

Criteria, loading combinations, and definitions shall be in accordance with ASCE 7.

#### 1.3.1 Dead Loads

The dead load shall consist of the weight of all permanent construction such as roof, framing, covering members and all other materials of the building system.

#### 1.3.2 Collateral Loads

Collateral load of 250 Pa shall be applied to the entire structure to account for the weight of additional permanent materials other than the building system, such as sprinklers, mechanical systems, electrical systems, hung partitions, and ceilings. This allowance does not include the weight of hung equipment weighing 25 kg or more. Equipment loads of 25 kg or more shall be shown on the shop (detail) drawings and the structure (frame, purlins, girts) shall be strengthened as required. The Contractor is responsible for providing the building manufacturer the magnitude and approximate location of all concentrated loads greater than 25 kgs before design of the building commences.

#### 1.3.3 Roof Live Loads

##### 1.3.3.1 Uniform Loads

Uniform roof live loads, including maintenance traffic and construction loads, shall be applied as shown on the contract drawings.

##### 1.3.3.2 Concentrated Loads

In addition to roof live loads, a minimum design concentrated load of 1335 N shall be used to simulate a construction load on roof panels. The concentrated load shall be applied at the panel midspan and shall be resisted by a single standing seam metal roof panel, or a 610 mm wide corrugated metal panel, assumed to be acting as a beam. The undeformed shape of the panel shall be used to determine the section properties.

#### 1.3.4 Roof Snow Loads

Roof snow loads of 250 Pa shall be applied in accordance with ASCE 7 unless otherwise shown on the contract drawings.

#### 1.3.5 Wind Loads

Wind pressures shall be computed and applied in accordance with ASCE 7 unless otherwise shown on the contract drawings.

#### 1.3.6 Foundations

Foundations shall be as shown on the contract drawings., and a concrete compressive strength as specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE.

#### 1.3.7 Framing and Structural Members

Structural steel members and their connections shall be designed in accordance with AISC-04 or AISC Pub No. S342 L. Structural cold-formed steel framing members and their connections shall be designed in accordance with AISI-01. Aluminum structural members and their connections shall be designed in accordance with AA-02. Maximum deflection under applied live load, snow, or wind load shall not exceed 1/360th of the span length. Members with openings in their webs shall be designed with consideration of

the additional stresses which will result due to the openings. Deflections of the steel framing above and along the side of commercially framed door openings shall be limited to a maximum allowable deflection of  $1/360$  of the opening width to ensure proper operation of the doors. The contractor shall include the loads that the door transfers to the building frame in the design. Framed openings shall be designed to structurally replace the covering and framing displaced. The subpurlin and/or purlin spacing shall not exceed 750 mm on centers at the corner, edge and ridge zones, and 1500 mm maximum on centers for the remainder of the roof.

#### 1.3.8 Roofing and Siding

Except as otherwise specified, steel roofing and siding shall be designed in accordance with AISI-01. Aluminum roofing and siding shall be designed in accordance with AA-01. Section modulus and moment of inertia of aluminum sheet shall be determined for actual cross section dimensions by the conventional methods for actual design stresses and by effective width concept for deflection in accordance with AA-02. Maximum deflection for wall and roof panels under applied live load, snow or wind loads shall not exceed  $1/180$ th of the span length. The design analysis shall establish that the roof, when deflected under loading combinations, shall not result in ponding. Maximum deflections shall be based on sheets continuous across two or more supports with sheets unfastened and fully free to deflect. The calculated deflection from the concentrated load shall not exceed  $1/180$  of the span length. The methods for resisting lateral loads shall be cross-bracing, rigid frames, or wind columns.

#### 1.3.9 Provisions for Gutters And Downspouts

Gutters and downspouts shall be designed according to the requirements of SMACNA-02 for storms which should be exceeded only once in 5 years and with adequate provisions for thermal expansion and contraction. Supports for gutters and downspouts shall be designed for the anticipated loads. Roof drainage system to withstand rainfall intensity of 193 mm/hour , with 5 minute duration.

#### 1.3.10 Provisions for Louvers

Louvers shall be fixed-blade or adjustable as required by mechanical drawings, , and to be rainproof .

#### 1.3.11 Ventilators

##### 1.3.11.1 Circular Ventilators

Circular roof ventilators shall be as required by mechanical drawings.

#### 1.3.12 Drift Provisions

Lateral deflections, or drift, at the roof level of a structure in relation to the floor or slab on grade, caused by deflection of horizontal force resisting elements, shall be less than  $1/240$ th of the eave height.

#### 1.3.13 Grounding and Lightning Protection

Grounding and lightning protection shall be provided as specified in Section 13100 LIGHTNING PROTECTION SYSTEM.

### 1.4 DESIGN ANALYSIS

The design analysis shall be the design of a licensed Professional

Engineer experienced in design of this work and shall include complete calculations for the building, its components, and the foundations. Foundations shown on the drawings are based on loads derived from a representative set of similar building types. The Contractor shall obtain the services of a licensed Professional Engineer to verify that the foundations shown are adequate for the building supplied using the criteria in paragraph Foundations. Formulas and references shall be identified. Assumptions and conclusions shall be explained, and cross-referencing shall be clear. Wind forces on various parts of the structure, both positive and negative pressure, shall be calculated with the controlling pressure summarized. Lateral forces due to seismic loading shall be calculated and tabulated for the various parts and portions of the building. Computer programmed designs shall be accompanied by stress values and a letter of certification, signed by a licensed Professional Engineer, stating the design criteria and procedures used and attesting to the adequacy and accuracy of the design.

A narrative of the computer program delineating the basic methodology shall be included. Computer program output shall be annotated and supplemented with sketches to verify the input and output. Critical load conditions used in the final sizing of the members shall be emphasized. The design analysis shall include the name and office phone number of the designer, who shall function as a point of contact to answer questions during the detail drawing review.

#### 1.5 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

##### SD-01 Data

Design Analysis; G, RE.

Design analysis (building with anchor bolt plans) as one package with the drawings.

Instruction Manuals; FIO.

Manufacturer's literature for individual building component systems.

Erection Procedures; GA.

Manufacturer's erection instruction and erection drawings describing the preparation requirements, assembly sequence, temporary bracing, shoring, and related information necessary for erection of the metal building including its structural framework and components.

##### SD-04 Drawings

Metal Building Systems; GA.

Detail drawings consisting of catalog cuts, design and erection drawings, and an isometric view of the roof showing the design wind uplift pressure and dimensions of edge and corner zones. Shop painting and finishing specifications. Anchor bolt placement plan and column reactions.

##### SD-08 Statements

Qualifications; FIO.

Qualifications of the manufacturer, the manufacturer's Representative

when one is used, and qualifications and experience of the building erector. A brief list of locations where buildings of similar design have been used shall be included with the detail drawings and shall also include information regarding date of completion, name and address of owner, and how the structure is used.

#### SD-13 Certificates

Metal Building Systems; FIO.

a. A Certificate from the metal building manufacturer stating that the metal building was designed from a complete set of the contract drawings and specifications and that the building furnished complies with the specified requirements.

b. Mill certification for structural bolts, framing steel, roofing and siding, and steel wall liner panels.

c. Warranty certificate. At the completion of the project the Contractor shall furnish signed copies of the 5-year Warranty for Metal Building System, a sample copy of which is attached to this section, the 20-year Manufacturer's Material Warranties, and the Manufacturer's 20-year System Weathertightness Warranty when one is required.

Insulation; FIO.

Certificate attesting that the polyisocyanurate insulation furnished for the project contains recovered material, and showing an estimated percent of such recovered material.

#### SD-14 Samples

Accessories; FIO.

One sample of each type of flashing, trim, closure, cap and similar items. Size shall be sufficient to show construction and configuration.

Roofing and Siding; FIO.

One piece of each type and finish (exterior and interior) to be used, 225 mm long, full width. The sample for factory color finished covering shall be accompanied by certified laboratory test reports showing that the sheets to be furnished are produced under a continuing quality control program and that a representative sample consisting of not less than 5 pieces has been tested and has met the quality standards specified for factory color finish.

Fasteners; FIO.

Two samples of each type to be used, with statement regarding intended use. If so requested, random samples of bolts, nuts, and washers as delivered to the job site shall be taken in the presence of the Contracting Officer and provided to the Contracting Officer for testing to establish compliance with specified requirements.

Insulation; FIO.

One piece of each type to be used, and descriptive data covering installation.

Gaskets and Insulating Compounds; FIO.

Two samples of each type to be used and descriptive data.

Sealant; FIO.

One sample, approximately 0.5 kg, and descriptive data.

Wall Liners; FIO.

One piece, 225 mm long, full width.

#### 1.6 DELIVERY AND STORAGE

Materials shall be delivered to the site in a dry and undamaged condition and stored out of contact with the ground. Materials other than framing and structural members shall be covered with weathertight coverings and kept dry. Storage accommodations for roofing and siding shall provide good air circulation and protection from surface staining.

#### 1.7 WARRANTIES

The Metal Building System, composed of framing and structural members, roofing and siding, gutters and downspouts, accessories, fasteners, trim, and miscellaneous building closure items such as doors and windows (when furnished by the manufacturer) shall be warranted as described below against material and workmanship deficiencies, system deterioration caused by exposure to the elements and service design loads, leaks and wind uplift damage. Any emergency temporary repairs conducted by the owner shall not negate the warranties.

##### 1.7.1 Prime Contractor's Weathertightness Warranty

The Metal Building System shall be warranted by the Contractor on a no penal sum basis for a period of five years against materials and workmanship deficiencies; system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The Metal Building System covered under this warranty shall include but is not limited to the following: framing and structural members, roofing and siding panels and seams, interior or exterior gutters and downspouts, accessories, fasteners, trim, flashings and miscellaneous building closure items such as doors and windows (when furnished by the manufacturer), connectors, components, and fasteners, and other system components and assemblies installed to provide a weathertight system; and items specified in other sections of these specifications that become part of the metal building system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks and wind uplift damage shall be repaired as approved by the Contracting Officer. See the attached Contractor's written warranty for issue resolution of warrantable defects. This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractor shall supplement this warranty with written warranties from the installer and/or system manufacturer, which shall be submitted along with Contractor's warranty. However, the Contractor is ultimately responsible for this warranty. The Contractor's written warranty shall be as outlined in attached **WARRANTY FOR METAL BUILDING SYSTEMS**, and start upon final acceptance of the facility. The Contractor shall provide a separate bond in an amount equal to the installed total metal building system cost in favor of the owner (Government) covering the Contractor's warranty responsibilities effective throughout the five year Contractor's warranty period for the entire metal building system as outlined above.

### 1.7.2 Manufacturer's Material and/or System Weathertightness Warranties

The Contractor shall furnish, in writing, the following manufacturer's material warranties to the Contracting Officer which cover all Metal Building System components:

a. A manufacturer's 20 year material warranty warranting that the specified aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed securement system including fasteners and coil material.

b. A manufacturer's 20 year exterior material finish warranty on the factory colored finish warranting that the finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight, as determined by ASTM D 4214 test procedures; or change colors in excess of five CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to replacing the defective coated material.

### 1.8 COORDINATION MEETING

A coordination meeting shall be held within 45 days after contract award for mutual understanding of the metal building system contract requirements. This meeting shall take place at the building site and shall include representatives from the Contractor, the roofing/metal building system manufacturer, the roofing/metal building supplier, the erector, the designer, and the Contracting Officer. All items required by paragraph SUBMITTALS shall be discussed, including applicable standard manufacturer shop drawings, and the approval process. The Contractor shall coordinate time and arrangements for the meeting

## PART 2 PRODUCTS

### 2.1 BUILDING COMPONENTS

Each piece or part of the assembly shall be clearly and legibly marked to correspond with the drawings.

### 2.2 FRAMING AND STRUCTURAL MEMBERS

Steel 4.8 mm or more in thickness shall conform to ASTM A 36/A 36M, ASTM A 529/A 529M, ASTM A 572/A 572M, or ASTM A 588/A 588M. Uncoated steel less than 4.8 mm in thickness shall conform to ASTM A 570/A 570M, ASTM A 606, or ASTM A 607. Galvanized steel shall conform to ASTM A 653/A 653M, G 90 coating designation, 1.143 mm minimum thickness. Aluminum-zinc coated steel shall conform to ASTM A 792/A 792M, AZ 55 coating designation, 1.143 mm ) minimum thickness. Aluminum sheet shall conform to ASTM B 209M , 0.813 mm minimum thickness. Aluminum structural shapes and tubes shall conform to ASTM B 221M , or ASTM B 308/B 308M. Structural pipe shall conform to ASTM A 53, ASTM A 252, ASTM A 500, ASTM A 501, ASTM A 618, ASTM B 221M , ASTM B 241/B 241M or ASTM B 429. Holes for structural connections shall be made in the shop.

### 2.3 ROOFING AND SIDING

Roofing and siding shall be either steel or aluminum and shall have a factory color finish.

### 2.3.1 Roofing

Length of sheets shall be sufficient to cover the entire length of any unbroken roof slope unless otherwise approved. Width of sheets with overlapping configurations shall provide not less than 610 mm of coverage in place. Provisions shall be made for thermal expansion and contraction consistent with the type of system to be used. Panel shall have configurations for overlapping sheets. Roof deck assemblies shall be Class 90 as defined in UL 580. Exposed, penetrating fastener may be used. Height of corrugation at overlap of adjacent roof sheets shall be the building manufacturer's standard for the indicated roof slope.

### 2.3.2 Siding

Length of sheet shall be sufficient to cover the entire height of any unbroken height of wall surface unless otherwise approved. Width of sheets with overlapping configurations shall provide not less than 610 mm of coverage in place and interlocking ribs shall provide not less than 305 mm of coverage in place. Provisions shall be made for thermal expansion and contraction consistent with the type of system to be used. Siding shall have configurations for overlapping adjacent sheets or interlocking ribs for securing adjacent sheets. Siding shall be fastened to framework using concealed fasteners.

### 2.3.3 Steel Panels

Roofing and Siding shall be zinc-coated steel conforming to ASTM A 653/A 653M, G 90 coating designation; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating; or aluminum-coated steel conforming to ASTM A 463/A 463M, Type 2, coating designation T2 E5. Panels shall be 0.610 mm thick minimum, except that when the mid field of the roof is subject to design wind uplift pressures of 2.87 kPa (60 psf) or greater or the steel covering is used as a diaphragm, the entire roof system shall have a minimum thickness of 0.762 mm (0.030 inch). Prior to shipment, mill finish panels shall be treated to inhibit the formation of oxide corrosion. Panels that have become wet during shipment but have not started to oxidize shall be dried, and retreated in accordance with manufacturer's standard practice.

### 2.3.4 Aluminum Panels

Roofing and Siding shall be aluminum alloy conforming to ASTM B 209M, temper as required for the forming operation, minimum 0.813 mm (0.032 inch) thick.

### 2.3.5 Factory Insulated Panels

Insulated wall panels shall be factory-fabricated units with insulating core between metal face sheets, securely fastened together and uniformly separated with rigid spacers, facing of steel or aluminum of composition and gauge specified for covering, constructed in a manner that will eliminate condensation on interior of panel. Panels shall have a factory color finish. Insulation shall be compatible with adjoining materials; nonrunning and nonsettling; capable of retaining its R-value for the life of the metal facing sheets; and unaffected by extremes of temperature and humidity. The assembly shall have a flame spread rating not higher than 25, and smoke developed rating not higher than 450 when tested in accordance with ASTM E 84. The insulation shall remain odorless, free from mold, and shall not become a source of food and shelter for insects. Panels shall be not less than 200 mm wide and shall be in one piece for unbroken wall heights.

### 2.3.6 Factory Color Finish

Panels shall have a factory applied polyvinylidene fluoride finish on the exposed side. The exterior finish shall consist of a baked-on topcoat with an appropriate prime coat. Color shall match the color indicated in Section 09000 BUILDING COLOR 7 FINISH SCHEDULE]. The exterior coating shall be a nominal 0.025 mm thickness consisting of a topcoat of not less than 0.018 mm dry film thickness and the paint manufacturer's recommended primer of not less than 0.005 mm thickness. The interior color finish shall consist of the same coating and dry film thickness as the exterior. The exterior and interior color finishes shall meet the test requirements specified below.

#### 2.3.6.1 Salt Spray Test

A sample of the sheets shall withstand a salt spray test for a minimum of 1000 hours in accordance with ASTM B 117, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of not less than 8F, few No. 8 blisters, as determined by ASTM D 714; and a rating of 6, 3 mm failure at scribe, as determined by ASTM D 1654.

#### 2.3.6.2 Formability Test

When subjected to testing in accordance with ASTM D 522 Method B, 3 mm diameter mandrel, the coating film shall show no evidence of cracking to the naked eye.

#### 2.3.6.3 Accelerated Weathering, Chalking Resistance and Color Change

A sample of the sheets shall be tested in accordance with ASTM D 4587, test condition B. The coating shall withstand the weathering test without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Protective coating that can be readily removed from the base metal with tape in accordance with ASTM D 3359, Test Method B, shall be considered as an area indicating loss of adhesion. Following the accelerated weathering test, the coating shall have a chalk rating not less than No. 8 in accordance with ASTM D 4214 test procedures, and the color change shall not exceed 5 CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244.

#### 2.3.6.4 Humidity Test

When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, a scored panel shall show no signs of blistering, cracking, creepage or corrosion.

#### 2.3.6.5 Impact Resistance

Factory-painted sheet shall withstand direct and reverse impact in accordance with ASTM D 2794 13 mm diameter hemispherical head indenter, equal to 6.7 times the metal thickness in mm, expressed in Newton-meters, with no loss of adhesion.

#### 2.3.6.6 Abrasion Resistance Test

When subjected to the falling sand test in accordance with ASTM D 968, Method A, the coating system shall withstand a minimum of 50 liters of sand before the appearance of the base metal. The term "appearance of base metal" refers to the metallic coating on steel or the aluminum base metal.

#### 2.3.6.7 Specular Gloss

Finished roof surfaces shall have a specular gloss value of 30 plus or

minus at 60 degrees when measured in accordance with ASTM D 523.

#### 2.3.6.8 Pollution Resistance

Coating shall show no visual effects when covered spot tested in a 10 percent hydrochloric acid solution for 24 hours in accordance with ASTM D 1308.

#### 2.3.7 Accessories

Flashing, trim, metal closure strips and curbs, fascia, caps, diverters, and similar metal accessories shall be the manufacturer's standard products. Exposed metal accessories shall be finished to match the building finish. Molded closure strips shall be bituminous-saturated fiber, closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride premolded to match configuration of the roofing or siding and shall not absorb or retain water.

#### 2.4 WALL LINERS

Wall liners shall be 0.6 mm thick minimum for aluminum or 0.45 mm thick minimum for steel with the same composition specified for siding, and formed or patterned to prevent waviness and distortion, and shall extend from floor to the ceiling but no less than the height of the exterior metal siding. Matching metal trim shall be provided at base of wall liner, at top of wall liner, around openings in walls and over interior and exterior corners. Wall liners shall have the same factory color finish as specified for the exterior face of the wall panels. Colors shall be as specified in Section 09000 BUILDING COLOR & FINISH SCHEDULE.

#### 2.5 FASTENERS

Fasteners for steel wall and roof panels shall be zinc-coated steel, aluminum, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements.

Fasteners for aluminum wall panels shall be aluminum or corrosion resisting steel. Fasteners for attaching wall panels to supports shall provide both tensile and shear strength of not less than 3.34 kN (750 lbs) per fastener. Fasteners for accessories shall be the manufacturer's standard. Exposed wall fasteners shall be color finished or provided with plastic color caps to match the covering. Nonpenetrating fastener system for wall panels using concealed clips shall be manufacturer's standard for the system provided.

##### 2.5.1 Screws

Screws shall be as recommended by the manufacturer to meet the design strength requirements.

##### 2.5.2 End-Welded Studs

Automatic end-welded studs shall be shouldered type with a shank diameter of not less than 5 mm and cap or nut for holding covering against the shoulder.

##### 2.5.3 Explosive Actuated Fasteners

Fasteners for use with explosive actuated tools shall have a shank of not less than 3.68 mm with a shank length of not less than 13 mm for fastening panels to steel and not less than 25 mm for fastening panels to concrete.

##### 2.5.4 Blind Rivets

Blind rivets shall be aluminum with 5 mm nominal diameter shank or stainless steel with 3 mm nominal diameter shank. Rivets shall be threaded stem type if used for other than the fastening of trim. Rivets with hollow stems shall have closed ends.

#### 2.5.5 Bolts

Bolts shall be not less than 6 mm diameter, shouldered or plain shank as required, with proper nuts.

#### 2.6 GUTTERS AND DOWNSPOUTS

Gutters and downspouts shall be fabricated of aluminum, zinc-coated steel or aluminum-zinc alloy coated steel and shall have manufacturer's factory color finish. Minimum uncoated thickness of materials shall be 0.455 mm (0.018 inch) for steel and 0.8128 mm (0.032 inch) for aluminum. All accessories necessary for the complete installation of the gutters and downspouts shall be furnished. Accessories shall include gutter straps, downspout elbows, downspout straps and fasteners fabricated from metal compatible with the gutters and downspouts.

#### 2.7 LOUVERS

Louvers shall be fabricated of aluminum, zinc-coated steel, or aluminum-zinc alloy coated steel; shall have manufacturer's factory color finish; and shall be furnished with insect screens. Minimum uncoated thickness of materials shall be 1.214 mm (0.048 inch) for steel and 1.600 mm (0.064 inch) for aluminum. Manually operated louvers shall be designed to be opened and closed from the operating floor.

#### 2.8 CIRCULAR ROOF VENTILATORS

Circular roof ventilators shall be fabricated of aluminum or zinc-coated steel; shall have manufacturer's factory color finish, and shall be furnished with insect screens. Minimum uncoated thickness of materials shall be 0.455 mm (0.018) for steel and 0.813 mm (0.032 inch) for aluminum. Ventilators shall be designed to provide weathertight construction.

#### 2.9 TRANSLUCENT PANELS

Translucent panels shall be as indicated in Section: 08950 Translucent Wall & Roof Assemblies.

#### 2.10 DOORS

##### 2.10.1 Hinged Doors

Hinged doors and frames shall receive a galvanic coating and factory primer and shall conform to the requirements of Section 08110 STEEL DOORS AND FRAMES. Exterior doors shall have top edges closed flush and sealed against water penetration. Hardware shall be as specified in Section 08700 BUILDERS' HARDWARE.

##### 2.10.2 Overhead Doors Rolling Doors

Overhead rolling doors shall conform to the requirements of Section 08330 OVERHEAD ROLLING DOORS. Hardware shall be the manufacturers approved

standard.

### 2.10.3 INSULATION

Thermal resistance of insulation shall be not less than the R-values shown on the contract drawings. R-values shall be determined at a mean temperature of 24 degrees C in accordance with ASTM C 518. Insulation shall be a standard product with the insulation manufacturer's name or trademark and R-value. Identification shall be on individual pieces or individual packages. . Roof and wall insulation , including facings, shall have a flame spread not in excess of \_25 and a smoke developed rating not in excess of 150\_\_ when tested in accordance with ASTM E 84. The stated R-value of the insulation shall be certified by an independent Registered Professional Engineer if tests are conducted in the insulation manufacturer's laboratory.

### 2.11 Blanket Insulation

Blanket insulation shall conform to ASTM C 991.

### 2.12 Insulation Retainers

Retainers shall be type, size and design necessary to adequately hold the insulation and to provide a neat appearance. Metallic retaining members shall be nonferrous or have a nonferrous coating. Nonmetallic retaining members, including adhesives used in conjunction with mechanical retainers or at insulation seams, shall have a fire resistance classification not less than that permitted for the insulation.

### 2.13 SEALANT

Sealant shall be an elastomeric type containing no oil or asphalt. Exposed sealant shall be clear and shall cure to a rubber like consistency.

### 2.14 GASKETS AND INSULATING COMPOUNDS

Gaskets and insulating compounds shall be nonabsorptive and suitable for insulating contact points of incompatible materials. Insulating compounds shall be nonrunning after drying.

### 2.15 SHOP PRIMING

Ferrous surfaces shall be cleaned of oil, grease, loose rust, loose mill scale, and other foreign substances and shop primed. Primer coating shall be in accordance with the manufacturer's standard system.

## PART 3 EXECUTION

### 3.1 ERECTION

Dissimilar materials which are not compatible when contacting each other shall be insulated from each other by means of gaskets or insulating compounds. Improper or mislocated drill holes in panels shall be plugged with an oversize screw fastener and gasketed washer; however, panels with an excess of such holes or with such holes in critical locations shall not be used. Exposed surfaces shall be kept clean and free from sealant, metal cuttings, excess material from thermal cutting, and other foreign

materials. Exposed surfaces which have been thermally cut shall be finished smooth within a tolerance of 3 mm. Stained, discolored or damaged sheets shall be removed from the site. Welding of steel shall conform to AWS D1.1; welding of aluminum shall conform to AA-02.

#### 3.1.1 Framing Members and Anchor Bolts

Erection shall be in accordance with the approved erection instructions and drawings and with applicable provision of AISC-04. Framing members fabricated or modified on site shall be saw or abrasive cut; bolt holes shall be drilled. Onsite flame cutting of framing members, with the exception of small access holes in structural beam or column webs, will not be permitted. High-strength bolting shall conform to AISC Pub No. S329 using ASTM A 325M or ASTM A 490, ASTM A 490M bolts. Improper or mislocated bolt holes in structural members or other misfits caused by improper fabrication or erection, shall be repaired in accordance with AISC Pub No. S303. Concrete work is specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE. Anchor bolts shall be accurately set by template while the concrete is in a plastic state. Uniform bearing under base plates and sill members shall be provided using a nonshrinking grout. Separate leveling plates under column base plates shall not be used. Members shall be accurately spaced to assure proper fitting of panels. As erection progresses, the work shall be securely fastened to resist the dead load and wind and erection stresses. Supports for electric overhead traveling cranes shall be positioned and aligned in accordance with MHI CMAA 70.

#### 3.1.2 Roofing and Siding Installation

Siding shall be applied with the longitudinal configurations in the vertical position. Roofing shall be applied with the longitudinal configurations in the direction of the roof slope. Accessories shall be fastened into framing members, except as otherwise approved. Closure strips shall be provided as indicated and where necessary to provide weathertight construction. Fastener and fastener spacing shall be in accordance with manufacture design.

#### 3.1.3 Installation of Gutters and Downspouts

Gutters and downspouts shall be rigidly attached to the building. Spacing of cleats for gutters shall be 400 mm maximum. Spacing of brackets and spacers for gutters shall be 1 m maximum. Supports for downspouts shall be spaced according to manufacturer's recommendations.

#### 3.1.4 Louvers and Ventilators

Louvers and ventilators shall be rigidly attached to the supporting construction to assure a weather tight installation.

#### 3.1.5 Doors

Doors, including frames and hardware, shall be securely anchored to the supporting construction, shall be installed plumb and true, and shall be adjusted as necessary to provide proper operation. Joints at doors and windows shall be sealed according to manufacturer's recommendations to provide weathertight construction.

#### 3.1.6 Insulation Installation

Insulation shall be installed as indicated and in accordance with manufacturer's instructions.

### 3.1.7 Blanket Insulation

Blanket insulation shall be installed over the purlins and held tight against the metal roofing. It shall be supported by an integral facing or other commercially available support system.

### 3.2 Wall Liner

Wall liner shall be securely fastened into place in accordance with the manufacturer's recommendation and in a manner to present a neat appearance.

### 3.3 FIELD PAINTING

Immediately upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with the same material used for the shop coat. Shop-primed ferrous surfaces exposed on the outside of the building and all shop-primed surfaces of doors and windows shall be painted with two coats of an approved exterior enamel. Factory color finished surfaces shall be touched up as necessary with the manufacturer's recommended touch-up paint.

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY  
FOR  
METAL BUILDING SYSTEM

FACILITY  
DESCRIPTION: \_\_\_\_\_

BUILDING  
NUMBER: \_\_\_\_\_

CORPS OF ENGINEERS CONTRACT  
NUMBER: \_\_\_\_\_

CONTRACTOR

CONTRACTOR: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_

POINT OF  
CONTACT: \_\_\_\_\_

TELEPHONE  
NUMBER: \_\_\_\_\_

OWNER

OWNER: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

POINT OF  
CONTACT: \_\_\_\_\_

TELEPHONE  
NUMBER: \_\_\_\_\_

CONSTRUCTION AGENT

CONSTRUCTION  
AGENT: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_

POINT OF  
CONTACT: \_\_\_\_\_

TELEPHONE  
NUMBER: \_\_\_\_\_

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY  
FOR  
METAL BUILDING SYSTEM  
(continued)

THE METAL BUILDING SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY [\_\_\_\_\_] FOR A PERIOD OF FIVE (5) YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCIES, WIND DAMAGE AND STRUCTURAL FAILURE WITHIN PROJECT SPECIFIED DESIGN LOADS, AND LEAKAGE. THE METAL BUILDING SYSTEM COVERED UNDER THIS WARRANTY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING: FRAMING AND STRUCTURAL MEMBERS, ROOFING AND SIDING PANELS AND SEAMS, INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS, ACCESSORIES, TRIM, FLASHINGS AND MISCELLANEOUS BUILDING CLOSURE ITEMS SUCH AS DOORS AND WINDOWS (WHEN FURNISHED BY THE MANUFACTURER), CONNECTORS, COMPONENTS, AND FASTENERS, AND OTHER SYSTEM COMPONENTS AND ASSEMBLIES INSTALLED TO PROVIDE A WEATHERTIGHT SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THESE SPECIFICATIONS THAT BECOME PART OF THE METAL BUILDING SYSTEM. ALL MATERIAL AND WORKMANSHIP DEFICIENCIES, SYSTEM DETERIORATION CAUSED BY EXPOSURE TO THE ELEMENTS AND/OR INADEQUATE RESISTANCE TO SPECIFIED SERVICE DESIGN LOADS, WATER LEAKS AND WIND UPLIFT DAMAGE SHALL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE AND LEAKAGE ASSOCIATED WITH THE METAL BUILDING SYSTEM COVERED UNDER THIS WARRANTY SHALL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS WARRANTY SHALL COVER THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON [\_\_\_\_\_] AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

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(Company President)

(Date)

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY  
FOR  
METAL BUILDING SYSTEM  
(continued)

THE CONTRACTOR SHALL SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND/OR INSTALLER OF THE METAL BUILDING SYSTEM, WHICH SHALL BE SUBMITTED ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).
2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.
3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.
4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.
5. FAILURE OF ANY PART OF THE BUILDING SYSTEM DUE TO ACTIONS BY THE OWNER WHICH INHIBIT FREE DRAINAGE FROM THE ROOF, AND GUTTERS AND DOWNSPOUTS; OR CONDITIONS WHICH CREATE PONDING WATER ON THE ROOF OR AGAINST THE BUILDING SIDING.
6. THIS WARRANTY APPLIES TO THE METAL BUILDING SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.
7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES. REPORTS OF LEAKS AND BUILDING SYSTEM DEFICIENCIES SHALL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE BY TELEPHONE OR IN WRITING FROM EITHER THE OWNER, OR CONTRACTING OFFICER. EMERGENCY REPAIRS, TO PREVENT FURTHER ROOF LEAKS, SHALL BE INITIATED IMMEDIATELY; A WRITTEN PLAN SHALL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT SHALL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY  
FOR  
METAL BUILDING SYSTEM  
(Exclusions from Coverage Continued)

IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE METAL BUILDING SYSTEM REPLACED OR REPAIRED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR. IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS AND/OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION, UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED THE PARTIES SHALL, WITHIN 10 DAYS JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES SHALL CONFER WITHIN 10 DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE NAME REMAINS. THE REMAINING PERSON SHALL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED ETC., SHALL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT SHALL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT. A FRAMED COPY OF THIS WARRANTY SHALL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

-- End of Section --